

XI. Hymenoptera Orientalia, or Contributions to a knowledge of the Hymenoptera of the Oriental Zoological Region. Part VII.

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Since the publication of Part VI. of this series of papers on the *Hymenoptera* of the Oriental Zoological Region, there has appeared Col. C. T. Bingham's "Fauna of British India, *Hymenoptera*," Vol. I., which deals with the Aculeate Section of the Order, except the Ants. To facilitate reference I have, in this paper, followed Col. Bingham's arrangement, giving indications of the positions my new species will occupy in the system adopted by him. Further, I have pointed out certain omissions and corrections in his work.

It is necessary to say here that Col. Bingham's book only refers to British India, Burma and Ceylon, whereas the scope of my papers includes the Oriental Zoological Region as defined by Mr. A. R. Wallace—a very much wider area.

MUTILLIDÆ.

MUTILLA VISRARA, *sp. nov.*

Long. 8 mm.

Hab. Trincomali, Ceylon (*Yerbury*).

Allied to *M. niveosignata*, but differs in the basal segment not being "almost bare" at the base, but covered

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with long black hair, although not so thickly as at the apex, where it is densely covered with long fulvous hair, in the second segment beneath not having three longitudinal keels, in the ventral segments and legs being distinctly piceous, and in being two mm. smaller.

Head slightly wider, but not quite so long as the thorax; rounded in front, but not quite so much so behind, very coarsely rugosely punctured, the punctures longest and deepest in the centre of the front and vertex; behind the eyes it is developed to a greater extent than their greatest length; the eyes are small. Front and vertex covered with long black hairs; above the antennæ more thickly with silvery hair; on the clypeus it is equally long and pale golden. Antennal tubercles piceous at the apex, shining. Clypeus reddish, the apex bordered with black. Mandibles broadly red in the middle. Antennæ longer than the head and thorax united; distinctly tapering towards the apex; the scape shining, thickly covered with long silvery hair; piceous at the apex; the flagellum bare of hair except at the base, distinctly pruinose towards the apex; black, the apical joints rufous beneath; the third joint about one-third longer than the fourth; thorax quadrangular, scarcely widened towards the apex; the mesonotum, with a semicircular space on the top of the median segment, reddish, coarsely punctured, the punctures large and deep; the pronotum bearing long, blackish hairs; the mesonotum with depressed, pale golden, shorter hairs; the top of the median segment rounded, and bearing a row of large, deep punctures; the rest of it oblique; the sides with a row of large areæ; the centre has a blistered appearance and an indistinct keel down its centre; it is sparsely covered with long blackish hairs. Propleuræ reticulated; the metapleuræ also reticulated, but with the reticulations much larger and deeper; the mesopleuræ smooth, the lower part densely covered with long silvery

hair ; over the middle coxæ it is rufous. Legs black ; the anterior coxæ and femora rufous ; the other femora, tibiæ and tarsi more or less piceous ; the femora more sparsely, the tibiæ and tarsi much more thickly covered with long silvery hair ; the tibial spines thick, testaceous ; the calcaria white. Abdomen as long as the head and thorax united ; the basal segment irregularly reticulated ; the base covered, but not thickly, with long, black hair ; the apex fringed with long, fulvous, golden hair, which extends on to the base of the second segment ; the second segment coarsely irregularly reticulated, most strongly at the sides, thickly covered with long, black hair ; in its centre, in front of the middle, are two oval marks of silvery pubescence ; the other segments are covered with long, black pubescence ; on the third, are two marks of silvery pubescence, but wider and shorter than those on the second ; the apical segments are slightly fringed with silvery hairs at their apices ; the pygidial area smooth, shining, impunctate ; covered thickly at the sides with long, black and a few silvery hairs. The first and second ventral segments piceous ; the basal obliquely triangularly raised in the middle ; the basal part depressed before the apex ; the second segment broadly depressed in the middle at the base ; its apical half bearing large, deep, irregular punctures ; sparsely covered with long, white hairs ; the other segments closely punctured at the apices, thickly covered with long, silvery hair. The apices of the third and fourth ventral segments are obscure testaceous in the middle.

MUTILLA ELTOLA, *sp. nov.*

Long. fere 7 mm.

Hab. Trincomali, Ceylon (*Yerbury*).

A species very similar in form and markings to *M. rothneyi* Cam., but may be known from it by the median segment not having "a single central spine posteriorly."

Head large, subquadrate, very slightly narrowed gradually behind the eyes; black; the vertex broadly in the middle, and the front broadly, in the centre to the middle of the eyes, red, sparsely covered with long, fuscous, intermixed with shorter silvery, hair; the front and vertex strongly and distinctly longitudinally striolated, the striæ running into coarse punctures over the antennæ; the striæ behind the eyes stout, sharp, slightly oblique, and not extending below the level of the eyes; the antennal tubercles very smooth, rufo-piceous. Oral region piceous-red; the clypeus in the middle incised, the sides of the incision forming two stout projecting teeth. Mandibles ferruginous; the teeth black; except at the apex, sparsely covered with long, pale golden hair; thorax at the base very slightly narrower and not very much longer than the head, of nearly equal width throughout; the mesonotum, except at the base and at the sides, rufous, the black on the base being broader than on the sides, very coarsely longitudinally reticulated, the reticulations becoming wider and larger towards the apex; the median segment with an oblique slope; reticulated, the reticulations much larger than on the mesonotum. The sides of the mesonotum above with projecting teeth; those at the base indistinct; the central very large, straight, sharp at the apex; that behind it blunt, curved, longer; the teeth on the median segment finer, curved, five in number; the central being the longest. Pleuræ not excavated, smooth, shining, impunctate; the propleuræ at the apex piceous; the base of the meso- and the meta-pleuræ thickly covered with longish, silvery pubescence. Antennæ longish, distinctly tapering towards the apex; the under side of the scape of the second, and of the base of the third joint, rufous; the scape punctured, thickly covered with longish silvery hairs; the flagellum thickly covered with a silvery down; the third joint twice the length of the fourth.

Legs black, thickly covered with longish, silvery hair; the tarsi towards the apex more or less rufous; the calcaria white. Abdomen as long as the head and thorax united, black; a silvery spot on the apex of the basal segment at the apex; a large, round, central and a smaller, more elongate mark on the side of the second segment, and the centre of the fourth and fifth segments broadly in the centre, covered with silvery pubescence; the basal segments punctured, sparsely covered with long black hairs; the pygidium shining, covered with long, black hairs; the centre slightly raised, impunctate; the rest punctured, the punctures large, moderately deep and clearly separated. The basal ventral segment testaceous; the apical three-fourths keeled down the middle; the keel black, dilated at the base, but not much; the second segment with large, shallow punctures, sparsely covered with long, pale hairs; towards the apex the middle projects into a stout, somewhat triangular, tooth; the other segments closely and rather strongly punctured except at the base, and covered with long hair; the hypopygium closely punctured and for the greater part testaceous.

Might be the ♀ of *M. adipus*, but this is a point which can only be settled by direct observation.

MUTILLA SIMPLICATA, *sp. nov.*

Long. 10 mm. ♀.

Hab. Mahaganay, Ceylon (*Yerbury*).

Belongs to the limited group of *Mutilla kanaræ* Cam. and *M. atomus* André, distinguished by having no spots on the abdomen, having instead broad bands of reddish-fulvous pubescence; the legs red, the antennæ black, reddish at the base. *M. kanaræ* is a larger species than this, its thorax is red: the head covered above with fulvous pubescence; and the second abdominal segment fulvous

at the apex only; *M. atomus* has also the head red, and the antennæ and thorax entirely ferruginous.

Antennæ stout, the basal three joints ferruginous; the scape sparsely covered with longish, pale golden hair; the flagellum with a white, microscopic pile. Head as wide as the thorax; dark ferruginous, darker on the vertex; coarsely punctured, sparsely covered with long, pale golden hair; the third joint of the antennæ as long as the following two united. Thorax rounded in front, not much narrowed behind, the sides straight; above coarsely rugosely reticulated, sparsely covered with long, black hairs. Legs entirely ferruginous-red, covered with long, white hair; the spurs pale; the tibial spines stout, reddish. Abdomen black, velvety; the apex of the basal segment covered rather densely with long, pale golden hair, the second segment broadly at the base, and the third and fourth entirely with golden, depressed pubescence; the other segments black, and bearing black hairs; the pygidial area strongly longitudinally striolated.

The thorax in my only example is somewhat crushed, and I cannot satisfactorily describe its sides; the mesopleuræ appear, however, to be smooth; the median segment coarsely punctured, and sparsely covered with long, white hair.

MUTILLA ÆDIPUS Cam.

Col. Bingham (*l.c.*, p. 27) gives *Mutilla ædipus* Cam. (he calls it *contracta*) as the ♂ of *M. rothneyi* Cam. There is, however, no evidence, except surmise, that this is the case; and, like so many other species, it had better be kept distinct until direct observation shows what its female really is. Col. Bingham states further that it is not really apterous—that its wings have been torn off. There is nothing novel in the fact of there being an apterous male *Mutilla*, for there is more

than one undoubted instance known; and, when such is the case, the form of the thorax in the ♂ approximates to that of the females. Such is certainly the case with *M. adipus*, in which I am not only unable to find any trace of there having been wings, but so far as the hind wings are concerned, I cannot see where they could have been attached. The contracted thorax is well shown in my figure (*Manch. Memoirs*, vol. xli., No. 4, pl. 4, f. 13). A comparison of my figure with that of *M. perfecta* Rad., shows great similarity between these apterous males in structure of the thorax.*

Mutilla acidalia Cam., described (*Manch. Memoirs*, l.c., p. 56) in both sexes by me, is omitted entirely by Bingham.

Col. Bingham also has overlooked my description of both sexes of *Mutilla opulenta* (*Manch. Memoirs*, l.c., p. 57).

MUTILLA APICIPENNIS Cam.

This species is not mentioned by Bingham under this name, unless he regards it as identical with *M. pedunculata* Klug (l.c., p. 51). If so, his description of the latter is defective in a very important point, namely, he says nothing about the petiole being serrate, or irregularly armed with teeth beneath, this being one of the most specific features whereby *M. pedunculata* is distinguished from the very closely-allied *M. chlorotica* Grib. I have not at hand Klug's original description, but *M. apicipennis* does not agree with Gribodo's description of *M. pedunculata*, e.g., the second abdominal segment is not coarsely and strongly rugosely punctured, *M. apicipennis* having it only irregularly roughened at the base; in *M.*

* For details regarding the apterous males, as well as the generic position of *Mutilla apicipennis* and its allies, see the work of Radoszkowski, *Horæ Soc. Ent. Ross.*, XIX. 1885, and the more recent paper by M. Ernest André, *Mém. Soc. Zool. France*, 1896, pp. 261-277.

pedunculata the epipygium is said to be smooth, longitudinally carinate in the middle; in *M. apicipennis* it is only smooth at the base, the rest closely rugosely punctured and without a trace of a keel (*cf.*, Gribodo, *Ann. Mus. Civ. Genova*, xx., p. 390). *M. pedunculata* is known from Arabia and Berbera. It, with *M. chlorotica* Grib., and perhaps *M. asiatica* Rad., forms the genus or subgenus *Tricholabiodes* Rad.

When I described *M. apicipennis*, I relied (not having Klug's work to consult) on the description of *M. pedunculata* given by Sichel and Radoszkowski in their Monograph of the Old World *Mutillidæ*. Their *M. pedunculata* is assuredly not *M. apicipennis*, but is perhaps *M. chlorotica* Grib. It has not the petiole serrate beneath, nor is any mention made of there being two furrows on the mesonotum. *M. chlorotica* (also from Arabia) differs from *M. apicipennis* in having the abdomen without any black, the petiole without teeth, and all the abdominal segments obliquely punctured. It seems to me therefore clear that *M. pedunculata* Klug must be deleted from the lists of Oriental *Mutillidæ*, unless the example from "Western India" recorded by Bingham, be the true *M. pedunculata*, in which case his description does not fit it.

MUTILLA POSTHUMA, *sp. nov.*

Long. 4.5 mm.

Hab. Trincomali, Ceylon (*Yerbury*).

In the table (*Manchester Memoirs*, Vol. 5 (1892), p. 123-4) this species comes in at "15. Head red, wholly or in part."

16. Abdomen with one spot and one band.

16a. Head and thorax with golden hair; antennæ entirely rufo-testaceous; pygidial area black, not longitudinally striated. Length 7 mm. *M. poonaensis* Cam.

16b. Head and thorax without golden hair; antennæ at the base pallid testaceous, fuscous towards the apex; the pygidial area testaceous, distinctly longitudinally striated. Length 4.5 mm. *M. posthuma*.

The little *M. atomus* André is readily separated from it by the pygidium not being striated. Antennæ stout, thickened towards the apex; pallid-testaceous, infuscated towards the apex, sparsely pilose, the third and fourth joints equal in length. Head, if anything, wider than the thorax; the front and vertex strongly punctured, dark rufo-testaceous; the oral region and the tubercles pallid-testaceous, as is also the base of the mandibles; the tubercles large, shining; behind, the head is developed one-half the length of the eyes. Thorax, with the sides above, straight, slightly and gradually narrowed towards the apex; the mesonotum coarsely punctured; the median segment with a slight oblique slope, rounded at the top. Pleuræ slightly excavated, smooth and shining; the middle with long, white hair. Legs thickly covered with long, white hair; testaceous, the femora darker, the tarsi paler. Abdomen a little longer than the head and thorax; black, with a slight violaceous tinge; the base and apical segments rather thickly covered with long, pale hair; the anal segment rufo-testaceous, strongly longitudinally striolated. Ventral surface black; the basal segment testaceous, with a straight, blunt centre; the other segments fringed thickly with long, white hair.

MUTILLA CONSOCIATA, *sp. nov.*

Long. 5 mm. ♀.

Hab. Trincomali, Ceylon (*Yerbury*).

Agrees closely with *M. posthuma*; but instead of the apex of the second abdominal segment being entirely covered with silvery pubescence, it has only a square mark of it in the centre, there being also similar marks on the fourth and fifth; the anal segment is black and is only finely, not strongly, punctured, and, at the sides, is thickly covered with longish, stiff, black hairs; the apex of the median segment is more sharply oblique, and not rounded

at the top ; the vertex is not so dark, nor the base of the antennæ so light, in tint. It also resembles *M. regia* Sm., but that is much larger ; its abdomen has a very decided bluish tint ; its mesonotum has in front a large mark of silvery pubescence, and the median segment has a rounded slope. *M. poonaensis* may easily be known by its thorax being longer and distinctly narrowed towards the apex, the thorax of *M. consociata* being of uniform width.

Head as wide as the thorax ; the front and vertex coarsely punctured, the vertex slightly infuscated ; and with only a few short, black hairs ; the oral region with some long silvery hairs ; the tips of the mandibles black. Antennæ stout, rufous, blackish towards the apex ; the scape with a few large punctures and a few silvery hairs ; the third joint twice the length of the second and one-half the length of the fourth. Thorax short, of uniform width ; the mesonotum strongly punctured, sparsely covered with long, silvery hair ; the median segments with a sharply oblique slope ; reticulated, and bearing long, fuscous hair ; the reticulations are weaker and smaller on the bottom. Pleuræ shining, not excavated ; the middle thickly covered with long, depressed, silvery hair. Legs rufo-testaceous, thickly covered with long, white hair ; the hinder knees infuscated. Abdomen hardly so long as the head and thorax united ; deep black ; an elongated mark of silvery pubescence in the centre of the second segment, a transverse one at its apex, and one in the centre of the fourth and fifth segments ; the anal segment finely longitudinally striated ; the centre in the middle piceous ; the ventral segments thickly covered with long, white, silvery hair.

MUTILLA INDECORA, *sp. nov.* (Pl. 4, fig. 1.)

Long. 4 mm.

Hab. Ceylon, Trincomali (*Yerbury*).

Agrees with *M. serratula* Cam. and *M. veda* Cam. in having the thorax spined and the abdomen with golden markings. From *M. serratula* it may be known by its head being red, not black, by having only a golden mark on the apex of the second abdominal segment, not a complete band, and by the metapleuræ being coarsely punctured; *M. veda* is to be known from it by the large belt of golden pubescence on the apex of the second abdominal segment, by the much less strongly punctured metapleuræ, and by the apical abdominal segment above being densely covered with golden pubescence.

Head, if anything, wider than the thorax; dark rufous, slightly infuscated on the vertex; strongly and coarsely punctured, thickly covered with long fuscous hair; the space behind the eyes as long as the eyes; the oral region thickly covered with long, white hair. Mandibles rufous, their apices broadly black. Antennæ stout, the flagellum blackish; the scape rufo-testaceous, shining, sparsely covered with longish, white hair, and having some large punctures. Thorax somewhat narrower than the head and about double its length, of nearly equal length throughout, closely rugosely punctured; the median segment with an oblique slope, and punctured all over, the punctures distinctly separated; at the top is one large central tooth and four smaller lateral ones. Pro-, meso- and base of meta-pleuræ shining, impunctate; the rest of the metapleuræ strongly punctured, the punctures large and deep. At the apex of the mesopleuræ above is a large tooth; on the sloping part of the metapleuræ are six smaller teeth also above. Legs stout, rufo-testaceous, the spurs paler; thickly covered with long, pale, fuscous hair; on the hinder tibiæ are four long, sharp spines. Abdomen broad at the base; closely punctured; on the apex of the first segment is a roundish spot of golden pubescence; on the apex of the second in the middle is a similar mark,

double its size, and narrowed at the base; on the centre of the third is a small patch; and the apical segment is entirely covered with a long, pale golden hair. Ventral segments punctured, closely covered with long, white hair.

MUTILLA ERNESTI, *sp. nov.*

Long. 5 mm.

Hab. Trincomali, Ceylon (*Yerbury*).

Belongs to the group of *M. serratula* Cam., except that the head is not black, only dark ferruginous. From *M. veda* and *M. indecora*, it may be known by the darker colour of the head and thorax, by the deeper tint of the abdominal marks, and by the second abdominal segment being distinctly longitudinally striolated.

Head as wide as the thorax; the sides behind the eyes straight, and as long as the eyes; strongly punctured, shining, sparsely covered with long, fuscous hair; the antennal tubercles shining, smooth, piceous at the apex. Oral region piceous; mandibles ferruginous, broadly black at the apex. The scape and basal two joints of the flagellum ferruginous; the flagellum brownish beneath; the third joint is distinctly longer than the fourth. Thorax about twice the length of the head and of about the same width, scarcely narrowed towards the apex; above coarsely rugosely punctured; at the base the sides project into a stout, blunt, triangular tooth, in the middle there is a smaller triangular tooth, and at the top of the median segment on the sides are a few teeth, the lower indistinct. The median segment has a sharp oblique slope, which is for the greater part blackish; the top serrate, the three middle teeth being much the larger. Except the apex of the metapleuræ, which is strongly punctured, the pleuræ are shining and impunctate. Abdomen black; the apex of the first segment with a small, the second with

a much larger, semicircular mark of deep orange pubescence, mixed with pale golden hairs ; the second segment longitudinally striolated.

MUTILLA LITIGIOSA, *sp. nov.*

Long. 8 mm. ♀.

Hab. Trincomali, Ceylon.

In Bingham's table, this species comes in on p. 4—
"Second abdominal segment with two spots, the spots medial, one above the other."

The spots golden.

Legs and scape of antennæ red. *M. pulla* André.

„ „ „ black. *M. litigiosa.*

Antennæ stout, tapering very distinctly towards the apex, the scape sparsely covered with longish white hair ; the flagellum bare, or with a microscopic pile ; the apex of the scape and the base of the flagellum rufous beneath ; the third joint nearly one-half longer than the fourth. Head as wide as the middle of the thorax ; coarsely rugosely punctured ; sparsely covered with long, fuscous hair on the vertex ; on the face and oral region the hairs are paler, silvery white and more numerous ; the base of the mandibles piceous. Thorax rufous, except on the sternum ; rounded at the base and apex, becoming gradually, but not very much, thicker towards the apex ; above coarsely rugosely punctured ; the pleuræ excavated, smooth and shining ; their lower part black, and thickly covered with long, white hair ; the median segment broadly rounded at the top, and with an oblique slope. Legs black ; the tarsi more or less rufous towards the apex ; the femora sparsely, the tibiæ more thickly, covered with white hairs, the tarsi with the hairs thicker and stiffer ; the calcaria pale. Abdomen longer than the head and thorax united ; black ; a fringe of longish,

golden hair on the apex of the first segment ; a roundish mark near the base of the second segment in the middle ; a semicircular one on the extreme apex ; and a broad belt of golden pubescence on the apex of the third ; the other segments at the sides with long, pale golden hair ; the pygidial area rufous in the centre, strongly and uniformly longitudinally striolated. The basal ventral segment rufous at the sides ; the base with two stout curved keels ; shining ; the central keel stout, straight ; the second segment stoutly punctured ; the other segments at the base finely transversely striated ; their apices closely punctured, as are also their sides ; and they are covered sparsely with long, pale hair.

This species has a considerable resemblance to *M. buddha* Cam., but that is longer ; its legs are stouter shorter and more thickly haired ; the basal abdominal segment is wider compared with the second and more distinctly separated from it, the second segment itself being of equal breadth at base and apex, whereas in *M. litigiosa* the base of the segment is narrower than the apex ; and in *M. buddha* the pygidium is not striolated.

MUTILLA FALLACIOSA, *sp. nov.*

Long. 7-8 mm.

Hab. Trincomali, Ceylon (*Yerbury*).

Similar in form and coloration—black, with the thorax red above, the second abdominal segment with two white round spots, the one behind the other, and the whole of the third segment covered with silvery hair—to *M. constanciæ*, but easily separated by the very roughly tuberculated median segment. Is also not unlike *M. litigiosa* described in this paper, but that has the pleuræ red, the head more coarsely and not so thickly punctured, and the base of the thorax above is not black. Also not unlike *M. dives* Cam., but differs in the tuberculated median

segment, in the densely pilose head, and in the median segment not being so sharply oblique.

Head nearly as wide as the thorax ; rugosely punctured ; rather thickly covered with longish, silvery and more sparsely with longer, fuscous hairs ; the antennal tubercles and the basal half of the mandibles above, rufous ; rounded at the sides behind, it being there nearly the length of the eyes ; the scape of the antennæ covered with long, silvery hair ; the flagellum covered with a close, white down ; the third joint is a little, but still distinctly, longer than the fourth. Thorax twice the length of the head ; black ; the meso- and meta-notum red, except the base and sides of the former ; the mesonotum coarsely rugosely punctured, sparsely covered with short, depressed, golden hairs ; the median segment with a rounded slope, almost oblique towards the apex, where it is black ; coarsely reticulated ; the base coarsely tuberculated, the tubercles largest in the middle. The sides of the thorax above almost straight, rough ; the eyes bearing very long, blackish hairs. The pleuræ above rugosely punctured ; the rest smooth and shining ; their lower part thickly covered with long, silvery hair. Legs thickly covered with long, silvery hair ; the spines on the hinder tibiæ long, sharp. Abdomen as long as the head and thorax united ; deep, velvety black ; the basal segment thickly covered with silvery pubescence ; there is a spot of silvery pubescence on the second segment in the centre ; there is a mark, broader than long, a smaller almost square one in the centre, and the whole of the third segment is covered with silvery pubescence ; the segments are also sparsely covered with longish, black hair. Pygidial area longitudinally striolated, rufous in the centre. Petiole beneath with a blunt, slightly curved keel ; the second segment somewhat thickly at the apex, and the other ventral segments thickly covered with long, silvery hair.

MUTILLA STULTA, *sp. nov.*

Long. 8 mm. ♀.

Hab. Trincomali, Ceylon (*Yerbury*).

In Bingham's Table, (*l.c.*, p. 5) this species comes in at "b¹. Spot silvery white. b². First abdominal segment not ciliated with white hairs. a³. Second abdominal segment with a transverse band of white pubescence on its apical margin in addition to the spot," but it is very different from *M. decora* Sm., the representative of this section. With *M. trimaculata* it has no near relationship; but, judging from the descriptions, it must be nearly related to *M. coronota* Bingham. It is not *M. stridula* Rossi, *sec. Rad.* = *coronota* Fab., for that has the first segment "armé de dents et carène," which is not the case here; nor has it the pygidial area "ovale, assez grand, finement strié," nor are the tarsi reddish. It is not the *coronota* of Saussure, *Reise der Novara, Hymen.* p. 106, who quotes his Ceylonese species as doubtfully identical with *M. coronota* Fab. *M. coronota* Sauss. has the pleuræ "omnis excavata et polita, postice ad marginem leviter rugulata," while in the present species, the pro- and meta-pleuræ, are strongly and coarsely punctured.

Head wider than the thorax; black, the tubercles and the middle of the mandibles broadly rufous; coarsely punctured, the punctures large and deep; there is a distinct keel down the middle of the front; thickly covered with long, fuscous hair; the tubercles large, shining, impunctate, a fine keel between them; over them is a moderately thick, curved keel; behind the eyes the head is obliquely narrowed. Antennæ stout, the scape shining, sparsely covered with longish, pale hairs; the flagellum opaque, covered with a white down. Thorax distinctly narrower than the head, narrowed towards the base and apex; the pro- and meso-notum coarsely longitudinally

punctured, sparsely covered with short, black hair; the median segment has the hair much longer, especially at the base; the base is rounded, the apex oblique and has down its centre a keel; reticulated, the reticulations larger at the base; at the apex of the scutellar region is a transverse keel; and, in the centre of the median segment at the top, is a curved scale-like projection. At the apex of the mesothorax and at the base of the median segment is a small, projecting, roundish tubercle. The propleuræ rather coarsely punctured; the mesopleuræ not much excavated; smooth and shining, except over the middle coxæ, where it is punctured; in the middle on the lower half is a black, curved, oblique furrow; the metapleuræ coarsely punctured behind the oblique furrow. Legs black, thickly covered with pale hair; the tibial spines are few and longish; the spurs pale. Abdomen not much longer than the head and thorax united; a mark of white pubescence on the base of the second segment, which is, at the apex, thickly covered with white hair, forming a broad belt; the penultimate segment covered with long, white hair; the pygidial area smooth, shining, impunctate; the second segment is strongly punctured. Petiole beneath more or less piceous, the apical parts bluntly keeled; the apex itself obliquely pointed, the second ventral segment coarsely punctured, sparsely covered with short, white hair; a reddish transverse band before the apex; the third and following segments covered with long, white hair; the apices of the other segments (including the last) strongly punctured.

SCOLIIDÆ.

TIPHIA FULVOHIRTA, sp. nov.

Long. 8 mm. ♂.

Hab. Poona (*Wroughton*).

In Bingham's table (*l.c.*, p. 57) this species comes into the

section: "Wings hyaline or flavo-hyaline: b^2 . Median segment with three longitudinal carinæ; a^4 . Clypeus incised at apex:"

The area on the median segment nearly as broad as long: the metapleuræ with only 8 semi-oblique keels at the top; apex of abdomen not densely covered with fulvous hair.

T. incisa Cam.

The area on the median segment distinctly longer than broad: the metapleuræ strongly obliquely striolated all over, with much more than eight keels, the apical abdominal segments densely covered with fulvous hair.

T. fulvohirta.

Head shining, rather thickly covered with longish fuscous hair, above the antennæ closely rugose, the front and vertex with large, deep punctures, which are more numerous and closer together near the eyes; the clypeus, except at the apex, closely punctured, thickly covered with long, white hair; the apex in the middle smooth, and shining, and with a wide, distinct incision. Mandibles black, towards the apex broadly rufous: covered with long, white hair; the palpi testaceous. Antennæ stout, the scape strongly punctured, covered with longish, fuscous hair; the flagellum fuscous beneath, almost glabrous. Pronotum in front shining, the base impunctate, the rest of it covered with large, distinctly separated punctures, except a broad impunctate band on the apex; mesonotum with the punctures larger and more widely separated than on the pronotum; the scutellum punctured like the mesonotum, but with the punctures more widely separated; the post-scutellum punctured like the scutellum, but with the punctures smaller. The central area on the median segment with two keels: the space inside them transversely, rugosely punctured, except for a small shining depression at the apex; the inner side of the lateral areae rugose, the outer aciculated; the apex crenulated; the

apex of the segment has an oblique slope and is closely rugosely punctured. The base of the propleuræ aciculated longitudinally, the upper part with large, deep punctures; the apex, except at the top, closely longitudinally striated, this part being separated from the rest by a curved furrow; the lower part, under the larger punctures, smooth, impunctate. Mesopleuræ strongly punctured, except immediately under the wings, where there is a small impunctate space, separated from the rest by a deep, wide, curved furrow. Legs thickly covered with long, white hair; the fore knees, tibiæ and tarsi more or less rufous. Wings hyaline, with a decided greyish-fuscous tinge towards the apex; the stigma black, the nervures fuscous. Petiole shining, marked with scattered punctures, the apex, especially in the middle, almost impunctate; the second segment punctured, except in the middle towards the apex; its base obliquely depressed: the third and following segments opaque, closely and strongly punctured, thickly covered with long, pale fulvous hair. The ventral segments punctured, the punctures becoming smaller and more numerous towards the apex; the last segment with an impunctate line down the centre.

The rufous colour on the fore legs is not a specific character in this, or in the allied species, as the amount of it varies considerably. The same remark applies to the quantity of rufous or brownish in the colour of the antennæ. There is no trace of a central keel on the median segment in the present species.

Tiphia tarsata Cam. and *T. magretti* Cam. are omitted by Bingham; so also is *T. femorata* Fab., a European species recorded by Magretti, from Burma (*Ann. Mus. Civ. Genova*, (2) xii., 248).

MYZINE BENGALENSIS, *sp. nov.*

Long. 15 mm. ♀.

Hab. Poona, Bengal (*Wroughton*).

Bingham (*l.c.*, p.65) has been unable to assign the males of the Indian species to their respective females, and describes 7 males and 7 females as distinct species. Doubtless direct observation will be necessary to unite the sexes correctly; and, in default of this information, there is no course open but to treat them as distinct species. Of males, no species is described with red on the abdomen; but of females, there are three with the abdomen red wholly or in part. Of these the present species comes nearest to *M. mandalensis* Magretti, but that has segments 1-5 of the abdomen red and both wings hyaline at the base, the anal segments fuscous, the posterior wings "hyaline, the extreme apex somewhat fuscous," the tegulæ flavo-testaceous, and, in length, it is only 9-10 mm.

Head shining, rather thickly covered with long, white hair; the vertex with scattered punctures, except in the centre behind the ocelli; the ocellar region being also without punctures; the front more closely and strongly punctured; the clypeus strongly punctured except the apex; its middle carinate. Mandibles black, slightly rufous in the middle; the palpi dark testaceous. Scape of antennæ shining, sparsely covered with long, pale fulvous hair, and with large, deep punctures; the second joint also shining and punctured; the flagellum opaque, thinly covered with a pale down, the under side brownish; the basal joints produced on the under side beneath. The base of the pronotum transversely aciculate; the apex bearing all over large, deep punctures, and sparsely covered with long, pale fulvous hair. Mesonotum shining, having some large, deep punctures; and a deep, wide inner and a much narrower outer furrow on its apical two-thirds. Scutellum shining, its sides and apex bordered with large,

deep punctures ; near the centre there is one distinct row and a few other punctures. Post-scutellum shining and slightly punctured in the middle ; the sides strongly aciculated. Median segment strongly aciculated, the apex with the sides closely transversely striated ; down the centre at the base are two flat, irregular keels. Propleuræ punctured ; the apex closely obliquely striolated except at the top, which is punctured ; the metapleuræ stoutly obliquely striolated ; the upper part closely and finely at the base above. The coxæ and femora shining, sparsely covered with long, white hair, this being also the case with the fore tibiæ and tarsi ; the four hinder tibiæ very thickly covered with stiff, white hair ; their calcaria pale fulvous ; the tarsal hairs silvery, their spines pale fulvous. Wings violaceous, the base of the hinder pair hyaline. Abdomen ferruginous, the two apical segments black ; the sides and apex rather thickly covered with long, white hair ; the basal segment with shallow, widely separated punctures ; the other segments with the punctures fewer in number and more widely separated ; the pygidium coarsely punctured, except at the apex, which is pale yellow, dull rufous behind ; the ventral surface covered, not very thickly, with long, white hair.

A smaller species than *M. violaceipennis*, to which it is closely allied ; but from which it is very distinct, differing greatly in the sculpture of the thorax, the pronotum in *M. violaceipennis* being very coarsely longitudinally striolated, and the scutellum very coarsely punctured ; while in the present species those parts bear only scattered punctures ; the punctures on the head are also fewer, and neither so large nor so deep.

MYZINE VIOLACEIPENNIS, *sp. nov.*

Long. 19-20 mm. ♀.

Hab. Poona, Bombay (*Wroughton*).

In Bingham's table (*l.c.*, p. 65), it comes in at "a¹. Black, 2nd, 3rd, and base of 4th abdominal segment red, hind wings hyaline at base."

Which will now have to be sub-divided, as the terms will apply to two species.

1. Mesonotum rugose, post-scutellum and median segment smooth and shining. *M. madraspatana* Sm.

2. Mesonotum smooth, except for a few large, scattered punctures at the apex; post-scutellum rugose, with a few large punctures in the middle; the median segment opaque, uniformly finely rugose. *M. violaceipennis*.

Head black, shining; the middle of the vertex with a large, smooth space, except for four small punctures placed in a curve in front of a large, deep one; the rest of the front and vertex with large, deep, widely separated punctures, being, if anything, larger and distinctly more numerous over the antennæ, clypeus coarsely punctured, except at the extreme apex; the middle not carinate, mandibles entirely black, fringed with long, pale golden hair; the palpi dark testaceous. First and second joints of the antennæ shining, bearing some large, deep punctures; the flagellum pruinose, the microscopic pile giving it a whitish appearance. The base of the pronotum transversely coarsely aciculated; the vertical part smooth, impunctate; the basal part very coarsely rugose, the punctures very large, deep and elongated, running more or less into each other; mesonotum smooth and shining; on its apical half are a few large, deep, oval and round punctures; on the apical half there is, on each side, a narrow but distinct furrow. Scutellum very coarsely and deeply punctured all over; post-scutellum coarsely aciculated at the sides; its centre with a few moderately large punctures, median segment coarsely aciculated, opaque, the sides of the basal part obscurely transversely striated; the apex sharply oblique, its sides punctured, but not strongly; down the middle of the basal part runs a straight furrow,

slightly narrowed towards the apex ; its sides bordered by sharp keels, its centre with stout transverse keels. Propleuræ strongly punctured at the base ; the apical half strongly longitudinally striated ; the mesopleuræ coarsely punctured, except at the apex ; the metapleuræ strongly closely obliquely striated all over. Wings uniformly deeply violaceous, except the hinder pair at the base. Legs entirely black, shining, the femora sparsely covered with long, pale hair ; the outer side of the hind tibiæ thickly covered with white hair and more sparsely with thick, pale fulvous spines ; on the apex of the posterior tibiæ on the inner side is a thick patch of depressed, pale hair, and in front of the calcaria are four stout, pale fulvous spines ; the calcaria pale fulvous : the tarsal spines rufous. Abdomen shining, smooth : the petiole black, except at the apex, which is red like the 2nd, 3rd, and the basal three-fourths of the 4th segment. The pygidium coarsely irregularly longitudinally striolated, the striæ becoming smaller and less distinct towards the apex ; its sides bear long, pale hairs. The ventral segments are coloured like the dorsal ; the third, fourth, and fifth finely punctured at the base and apex : their middle with some large punctures ; the sixth with the punctures fewer and more scattered.

POMPILIDÆ.

POMPILUS ICHNEUMONIFORMIS Cam.

This is probably the species described by Bingham (*l.c.*, p. 110), as *Pseudagenia deceptrix* Sm. The two in my opinion are not identical, and my type does not agree with Smith's (now in the Oxford Museum). *P. deceptrix* is from Celebes.

SPHEGIDÆ.

LARRADA EXTENSA Walker.

This species is omitted by Bingham. It is from Ceylon. (*Cf. Ann. Mag. Nat. Hist.*, Vol. v. (1860), p. 305.)

SPHEX ROTHNEYI Cam.

Bingham regards this as identical with *Sphex vicinus* Lep., a species very badly described, and placed by Kohl in his Monograph among the unidentifiable species. *S. rothneyi* is, however, very probably only a local form of *Sphex pruinosis* Germar, a species recorded from South Eastern Europe, Western Asia, and North Africa (Syria, Caucasus, Soudan). If the two be identical *S. pruinosis* has a very wide range, as have a few other species of the same genus.

SPHEX XANTHOPTERUS Cam.

When I described this species as new (*Manch. Mem.*, (4) ii., p. 109) I was quite justified in doing so, as no such species had been recorded from the old world, and my name has been adopted by Kohl and Bingham. Kohl, however, has since (*Ann. k.k. Hofmus. Wien*, x., p. 52) recognized it, by an examination of the type in the Berlin Museum, as the same as *Sphex cinerascens* Dahlbom (*Hym. Eur.*, i., pp. 25 and 436). From this it follows that the American locality given by Dahlbom must have been erroneous.

SPHEX FLAVOVESTITUS Sm.

This Indian species is omitted by Bingham. The description (*Cat. Hym. Ins. Brit. Mus.*, iv., p. 253) is not very satisfactory; but, as the type is in the British Museum, an examination of it would either establish its specific distinctness, or give it decent burial in the synonymy.

SPHEX DEPLANATUS Kohl.

This species is omitted by Bingham. The following is Kohl's description (*Ann. k.k. Hofmus. Wien*, x., p. 53).

"♂. *Niger*; *abdomen ex parte rufum*. *Pedes nigri*. *Alæ infuscatæ violaceo-resplendentes*. *Caput et thorax*

albopilosa, segmentum medianum supra albo-villosa. Clypeus pubescentia argenteo-alba adpressa. Oculorum margines interiores ad verticem longitudine flagelli articuli 2^{di} + duarum tertiarum 3^{tii} ad clypeum paullulo minus approximati sunt. Scutellum haud convexum, fere deplanatum. Post-scutellum non sellæ instar ut in *Sph. aurulento impressum*. Area dorsalis segmenti mediani rugis quinque transverse rugosa. Petiolus aliquantum brevior est quam in *Sph. aurulento F.*, multo brevior quam in *Sph. pruinoso G.*: longitudine antennarum flagelli articulo secundo aequalis; paullulum brevior tarsi postici secundi, sed paullulo longior tertio."

Long. 20 mm.

Hab. Ceylon.

Allied to *S. pruinosis* and *S. aurulentus*.

ALYSON RUFICOLLE, *sp. nov.*

Nigrum, prothorace, mesonoto cum scutello mesopleurisque rufis, ore flagelloque antennarum subtus flavis; alis hyalinis, nervis fuscis. ♂.

Long. fere 5 mm.

Hab. Kandy, Ceylon (*Yerbury*).

Head black; a line on the inner orbits of the eyes from near the top, labrum, clypeus, mandibles, and palpi, yellow; the tips of the mandibles black; front and vertex closely punctured, thickly covered with black hair; the clypeus and mandibles with much longer white hair. Pro- and meso-notum closely, but not strongly, punctured; the prothorax entirely, except a black mark on the base in front, the mesonotum with the scutellum and post-scutellum and the mesopleuræ, red; the median segment with two stout converging (but not uniting) keels in the centre, inside of which are two oblique keels, which unite to them shortly beyond the middle of the basal region; inside of these there are some stout transverse keels,

except at the apex ; the apex is rounded ; down the middle is a straight stout keel ; across the middle a stout, transverse one, at the side of this are two short, curved, irregular keels ; at the apex itself there is, on each side, a stout, oblique keel. The base of the propleuræ distinctly aciculated ; in the centre of the mesopleuræ is a wide, moderately deep, oblique depression. Legs black ; the apex of the anterior coxæ white ; the anterior knees, tibiæ and tarsi pale testaceous ; the apex of the posterior coxæ, the apex of the trochanters and a broad band near the apex of the tibiæ, testaceous ; the extreme apex of the hinder femora and its large tooth, piceous. Wings hyaline, but with a faint fuscous tint ; the nervures fuscous ; the recurrent nervures interstitial ; abdomen shining, impunctate ; the maculæ large, pallid yellow.

A very distinct species from *A. annulipes*, being readily known from it by the red collar, and by the absence of a fascia in the anterior wings.

DIODONTUS GENICULATUS, *sp. nov.*

Niger, nitidus, segmento mediano striolato; mandibulis tegulisque flavis; basi tibiarum testaceo; alis hyalinis, nervis fuscis, stigmatate nigro. ♀.

Long. 4-5 mm.

Hab. Mussooree, 6,000 ft. (*Rothney*).

Comes near to *D. striolatus* Cam. from Lahore (*Manchester Memoirs, xli., p. 19*), but readily separated from it by the pro- and meso-pleuræ not being striated, by the four hinder tibiæ being black, except at the base, and by the strongly transversely and longitudinally striolated median segment.

Head large, wider than the thorax ; almost shining, bearing some shallow, not very distinct, punctures ; the front and vertex with a sparse, microscopic black pile ; the oral region with a silvery pubescence and with long, white,

soft hairs ; the clypeus with a small tooth on either side, the centre not being incised. Mandibles large ; the basal half yellow ; the apical piceous ; the palpi dirty yellow ; antennæ entirely black ; the scape shining, bare, impunctate ; the flagellum covered with a microscopic down ; the third and fourth joints equal in length. Thorax shining, glabrous, except for a very slight microscopic pile ; the median segment strongly aciculated, and with six longish, and three very short, irregular, longitudinal keels in the centre, the lateral pairs being united at the apices by a curved keel ; the apex has an oblique slope, is irregularly transversely striated and has an elongated fovea in the middle ; it is closely covered with a short, fuscous pile. Pro- and meta-pleuræ shining ; the mesopleuræ shagreened ; the metapleuræ with a few oblique, not very distinct, keels. Wings clear hyaline ; the second cubital cellule half as long at the top as it is at the bottom ; the second recurrent nervure is received very shortly beyond the middle of the cellule. Legs stout, covered with a white pubescence ; the tarsi more or less rufo-testaceous ; the base of all the tibiæ testaceous all round ; and the anterior more or less testaceous in front ; the hinder pair only testaceous at the base and bearing fine stout spines. Abdomen somewhat shorter than the head and thorax united, shining, pruinose ; the pygidial area strongly aciculated ; the sides distinctly keeled.

PASSALOEUCUS RÉTICULATUS, *sp. nov.* (Pl. 4, fig. 2.)

Nigro-caeruleus ; geniculis, tibiis tarsisque testaceis, alis hyalinis, stigmatibus fusco, nervis pallide flavis. ♀.

Long. 5 mm.

Hab. Barrackpore (*Rothney*).

Head shining, apparently bare ; black with a greenish hue ; the front broadly hollowed ; the hollow bordered by a stout keel, which originates in the front of the anterior

ocellus, where it bifurcates; from the side of the fore ocellus a narrower keel runs to the side, uniting with the larger keel before the eyes; the space between the keel and the eyes is stoutly crenulated. On the upper half of the eyes, but not touching them, is a narrow furrow; behind, on the upper half is a much wider, deeper, crenulated furrow; the lower part of the eyes on the inner and apical side is distinctly margined by a keel. Antennæ black, the scape slightly, the flagellum broadly, testaceous beneath. Thorax black, with a greenish tinge; the mesonotum shagreened; a fine transverse furrow at the base of the scutellum; down the centre of the mesonotum are two wide furrows which slightly converge towards the scutellum and are, towards the apex, slightly crenulated; in the centre are two obscure longitudinal furrows; and, outside the central, there are two narrower, complete furrows, which are distinctly curved towards the base of the thorax. At the base of the scutellum there is a wide, deep, straight furrow behind the narrower one. Scutellum large, indistinctly keeled down the middle; the sides straight, distinctly margined; post-scutellum distinct; the sides obliquely truncated towards the apex. Median segment with a decided coppery-greenish tint; the base completely areolated; all the areæ being distinctly defined; the middle portion is entirely occupied by a deep pentagonal area, wider than long and, of which, the apex is rounded inwardly; down its centre is a narrow furrow, and near its apex are two stout, transverse, somewhat curved keels; the apex itself is perpendicular and transversely roughened. In front of the tegulæ are two or three stout keels, and inside of these a few large, round punctures. Wings clear hyaline, the stigma fuscous, paler above; the costa in front of it fuscous, the rest of it and the nervures yellow; the second cubital nervure narrowed on the lower side; the second recurrent nervure almost interstitial. Femora sparsely

covered with white hair ; the trochanters, apex of femora, tibiæ, and tarsi rufo-testaceous. Petiole as long as the hinder coxæ ; coarsely shagreened, the sides distinctly margined ; beneath, it is prolonged to the apex of the second segment ; the base of the third segment being obliquely truncated beneath, it forms, with the apex of the petiole, a wide, triangular incision. The rest of the abdomen smooth and shining ; the apex without a pygidial area.

In some respects this species is intermediate between *Pemphredon* and *Passaloecus*, its petiole being longer than it is in the latter, but much shorter than in the former, from which it further differs in the hinder tibiæ not being spined ; in the head not being covered with long hair ; in the margined eyes, in the vertex and hollowed front bearing keels ; and in the median segment having keels which form large distinct areae, the lower part of the segment, too, being largely and deeply hollowed. The labrum is not emarginate at the apex, so far as I can make out from the dense silvery pubescence which covers the mouth ; the mandibles are large, not furrowed ; oblique at the apex, where there is one large, acute tooth, and a much smaller and blunter one, next to it. The eyes reach to the base of the mandibles and are parallel ; the antennæ are situated quite close to the base of the clypeus, but not touching it ; the transverse basal nervure is interstitial ; on the mesopleuræ there is one distinct, moderately wide and deep, complete, longitudinal furrow. The second cubital cellule is much narrower than it is in either *Pemphredon* or *Passaloecus* proper, and is much narrowed on the lower side ; the stigma is large ; the radial cellule elongate, lanceolate ; in the female, there is no pygidial area. The tubercles do not reach to the tegulæ.

This species, having only one longitudinal furrow on the mesopleuræ, is a *Passaloecus* as limited by Verhoeff (*Ent.*

Nachr., xxiv., p. 383) who forms for the species having two longitudinal furrows the sub-genus *Coeloecus* and for those having three the sub-genus *Heroecus*.

Only one oriental *Passaloecus* is known, viz., *P. levipes* Bingham, (*l.c.*, p. 267), from Karennee, Tenasserim, 4,000 ft., which is very different from the species here described; e.g., the median segment is transversely striated, the head is without keels, the thorax not punctured, &c. No mention is made either in the generic or specific descriptions of there being any furrows on the mesopleuræ or on the mesonotum.

CRABRO TAPROBANÆ, *sp. nov.*

Niger, scapo antennarum subtus, mandibulis, linea pronoti, maculis duabus scutelli, maculis 2 abdominis, tibiis tarsisque pro parte flavis; alis hyalinis, nervis nigris. ♀.

Long. fere 11 mm.

Hab. Trincomali, Ceylon (*Yerbury*).

This species does not fit into any of the sections in Bingham's table (*l.c.*, p. 321). The present species might be following his table) characterized as follows:

Enclosed space at base of median segment with five short, stout, widely separated striæ; coarsely aciculated; the sides of the segment next the enclosed space with some oblique striæ; the third abdominal segments with two transverse yellow lines at the base.

Black; alutaceous; the mandibles, except at the apex, the scape of the antennæ, a broad line, somewhat interrupted in the middle, on the pronotum, the tubercles, a somewhat smaller mark behind them under the tegulæ, a mark on either side of the scutellum at the base, a smaller mark on the mesonotum next to this and nearer the wings, and an elongated line on either side of the third abdominal segment at the base, yellow. Head large, alutaceous, the front and vertex with a microscopic, fuscous

pile; the lower three-fourths of the orbits densely covered with a silvery pubescence; the clypeus covered with a longer and denser silvery pubescence. Ocelli . . . Clypeus stoutly keeled in the middle, its apex slightly projecting; mandibles yellow; the teeth black, the part at their base piceous. Scape of the antennæ shining, yellow, glabrous; the flagellum black, and covered with a microscopic down. Pronotum thickly covered with fuscous pubescence; the mesonotum thickly covered with a microscopic pile; the depression at the base of the scutellum crenulated; the post-scutellum closely longitudinally punctured; median segment finely rugosely punctured: the enclosed space at the base with a shallow, somewhat crenulated furrow in its centre; on either side of this are one short, and four longer, longitudinal keels; at the sides are a few oblique keels; the apex of the segment has a rounded, slightly oblique slope and is densely covered with white pubescence; its centre with a shallow furrow; its sides with a sharp keel extending from the base to the apex. Propleuræ hollowed, glabrous; the base with three stout, curved keels turned towards the base, and one turned towards the apex; the mesopleuræ alutaceous, densely covered with white pile; behind the tubercles is a sharp, distinct keel, oblique at the base, then following the edge of the pleuræ to the sternum; immediately behind the yellow mark is a distinct oblique furrow, running to the sternum, where it joins the keel. Metapleuræ closely and uniformly obliquely striated, except at the base, where there are, at the top, five longish, and, at the bottom, five shorter striæ; the two sorts being separated by a space. Legs black; the fore femora broadly yellow at the base and with a line, contracted in the middle, on the outer side at the apex; the tibiæ yellow, black behind; the tarsi yellow, more or less rufous towards the apex; the hind tibiæ spined; the middle spines originating from tubercles.

Wings hyaline, with a faint fuscous tinge. Abdomen as long as the head and thorax united, alutaceous; the petiole somewhat longer than the second segment, nodose at the apex; the third and fourth segments shining at the base; the fifth segment thickly covered, especially towards the apex, with fulvous pubescence, the apex of the segment itself being fulvous; the base of the pygidial area closely rugosely punctured; the narrowed apex shining, smooth, except for a few indistinct striæ; the sides of the segment fringed with long, stiff, pale fulvous hairs. On the side of the third segment is a large mark broader than long, the base rounded, narrowed in the middle, almost heart-shaped; on the side of the fourth segment is a more elongated yellow mark; the outer half broader, and dilated posteriorly; the mark on the side of the fifth segment is larger, wider, and projecting backwards on the lower side at the base. The ventral surface is sparsely covered with longish fuscous hair.

Only one species of *Crabro* is recorded from Ceylon by Col. Bingham, *C. palitans* Bing., which also is found in North-West India. It is very different from *C. taprobancæ*, having the abdomen not petiolated.

CRABRO YERBURI, *sp. nov.*

Long. 6 mm.

Hab. Trincomali, Ceylon (*Yerbury*).

Belongs to Bingham's section "*A. b.* Petiole short, subpyriform, gradually widened from base to apex." *C. odontophora* differs from it in the twisted, dilated and, at base, dentate basal joint of anterior tarsi, in the median segment being strongly aciculated; the hollows at its sides with stout keels. The "enclosed space" on the median segment very smooth, shining and glabrous; surrounded by a wide, moderately deep, crenulated furrow, and having a similar crenulated furrow down its centre;

the sides of the segments are finely transversely aciculated; the apex has an oblique slope and is widely hollowed in the middle. Mesopleuræ shining, minutely punctured, thickly covered with short, silvery pubescence; the oblique furrow shallow, densely covered with longish silvery hair; the metapleuræ shining, almost glabrous, the basal portion hollowed; there is an oblique, not very clearly defined, keel over the hinder coxæ, above which is a line of fine transverse striations. Legs thickly covered with white pubescence; the apices of the four anterior coxæ and of their trochanters, the apex of the fore femora, and the four front tibiæ and tarsi, yellow; the tibiæ broadly lined with black behind; the hinder tibiæ black, broadly yellow at the base; their spines longish, pale; their calcaria large, the inner one being, at the sides and base, finely rugose; the abdomen is marked with yellow.

C. ardens also differs from it in the base of the median segment being finely longitudinally striated, and it has "a medial vertically impressed line from the anterior ocellus to between the antennæ," while the legs and antennæ are devoid of yellow.

Head shining, impunctate; except on the lower part of the front, where it is obscurely punctured; the clypeus hidden by dense silvery pubescence; the vertex with a dense microscopic down; the space between the eyes over the antennæ bare, glabrous, except at the sides, where there is a narrow edging of silvery pubescence; the mandibles yellow, their apices rufo-piceous; palpi yellow. Prothorax shining, neither punctured nor striated; the apical part thickly covered with minute pubescence; the mesonotum with shallow minute punctures; sparsely covered with a microscopic down; the scutellum, if anything, more strongly punctured; a broad, irregular, yellow, transverse mark at its base; the post-scutellum broad at base, narrowed towards the apex; the apices of all the tarsi

incline to rufous. Wings clear hyaline, the stigma and nervures fuscous; the apical abscissa of the radius straight, oblique; the appendicular cellule incomplete at the apex. Abdomen nearly as long as the head and thorax united; the petiole slightly longer than the second segment, narrowed at the base, gradually widened towards the apex; the apical segments thickly covered with a white pubescence; the pygidial area smooth, except for a double row of five large, round punctures down the outer side of the centre; the sides keeled; the ventral segments shining, the apices of the segments pale piceous; the apical half of the hypopygium punctured.

Note.—I have stated above that only one Ceylonese species of *Crabro* is recorded by Col. Bingham in his Manual; but he has omitted from that work all mention of *Dasyproctus ceylonicus* Saussure, described from Ceylon in the *Reise der Novara*; *Hymen.* p. 85, *pl. iv. f. 51*. *Dasyproctus* is a *Crabro* with a very long, narrow petiole, not dilated towards the apex, as it is in *Rhopalum*. It is regarded by Kohl in his generic revision as a section of *Crabro* only.

CRABRO REVELATUS, *sp. nov.*

Long. to apex of petiole 6 mm. (in *C. taprobancæ* it is 7 mm.).

Hab. Trincomali, Ceylon (*Yerbury*).

Comes near to *C. taprobancæ*, and, like that species, has an elongate petiole, but here it is more slender; it differs further in the post-scutellum being coarsely longitudinally striated; in the vertex at the edge of the frontal depression being distinctly margined; and in the furrow on the middle of the apex of the median segment being wider.

Scape of antennæ lemon-yellow, shining, glabrous; the flagellum black, sparsely covered with a pale down; the second joint yellow beneath; the third only very little

longer than the fourth. Head black; alutaceous, the vertex covered with a dark, microscopic down; the front deeply excavated; thickly covered with depressed, silvery pubescence, as is also the clypeus; the frontal depression at the top with a distinctly-defined margin, the centre of which, looked at from beneath, is slightly curved; the eyes on the upper part on the inner side are slightly margined; below the middle is a small, human-ear-shaped fovea; the ocelli are in a curve. Mandibles lemon-yellow; the apex piceous-black; the basal part sparsely covered with long, white hairs. Mesonotum alutaceous, thickly covered with a microscopic, fuscous down; the pronotum with longer, fuscous hair; the scutellum like the mesonotum, its apex with some longitudinal striæ, and a thin keel runs down its middle; on its base at the side is a small, and, behind this, a larger, transverse yellow mark; the post-scutellum finely rugose; coarsely longitudinally striolate. Median segment with a rounded slope; the basal area clearly defined; bearing a few oblique, widely separated keels; those at the sides being more distinct than those in the middle and extend beyond the area, outside of which the segment is closely, but not very distinctly, punctured; the middle of the apical part has a wide, deep furrow. The propleuræ at the top have a few fine, indistinct striæ, the lower part in the centre has a few stout, longitudinal striæ. The tubercles are yellow; the oblique furrow behind them straight, narrow; the longitudinal furrow narrow, shining; the oblique furrow on the mesopleuræ wide, deep, indistinctly crenulated; the apical semi-vertical furrow wider, deeper, and distinctly crenulated; the meta-pleuræ at the base shining, strongly closely obliquely striated, the rest of it finely and closely longitudinally striated, the striæ stronger on the lower side. Legs: the apices of the coxæ, of the femora, and the tibiæ lemon-yellow; the tibiæ for the greater part black beneath; the

tarsi yellow, suffused with rufous; the femora covered with long, white hair. Wings hyaline, the nervures and stigma fuscous. Petiole covered with long, white, soft hair; alutaceous, the base closely longitudinally striated; its under part keeled down the centre and with a lateral keel between it and the edge. In this latter point—in the under side of the petiole being distinctly keeled down the centre—it differs from *C. taprobanae*.

DIPLOPTERA.

EUMENIDÆ.

EUMENES BUDDHA Cam.

This species is omitted entirely by Col. Bingham. It comes into his section "C: median segment convex, vertical, with a well-marked groove down the middle, widening at apex into a deep \wedge -shaped hollow": and to sub-section "a: Petiole long, gradually widening to the apex, longer, never shorter than the thorax and median segment united"; but it can hardly be said to be "medially with well developed, prominent lateral tubercles." The petiole is distinctly longer than the head and thorax but not longer than the other segments united; its basal third is distinctly narrowed, becoming gradually wider; the apical third is of uniform thickness.

It has pretty much the same form and size and colour of the wings as *E. vishnu*; but differs altogether in the colour of the legs, and in the form of the antennal tubercle, which here is rounded at the top and has a long pedicle; while in *E. vishnu* it is much shorter, broader and triangular at the top and with a short, broad pedicle.

EUMENES VISHNU, *sp. nov.*

Niger, thorace abdomineque flavo-maculatis; alis violaceis; pedibus rufis. ♀.

Long. 10 mm.

Hab. Allahabad (*Rothney*).

Belongs to the small group with red legs. *E. erythropoda* differs from it in being larger, in the thorax being largely marked with red; and in the petiole not being distinctly narrowed at the base and in being coarsely rugose. The form of the median segment is the same—rounded at the base, oblique at the apex—but it differs in the middle of the apex, having a deep triangular depression.

Antennæ black, distinctly thickened towards the apex; the scape shining, covered with black, short hair; the flagellum bare, not shining. Front and vertex strongly punctured, shining, sparsely covered with longish, fuscous hair; the antennal tubercles yellow, large, rounded at the base, gradually narrowed from the end of the rounded part to the apex. Clypeus with the middle of the apex curved, the sides oblique; thickly covered with silvery pubescence; at its base are two large, oblique, yellow marks narrowed on the inner side; the apex of the labrum rufous, as is also the apical half of the mandibles. Thorax coarsely punctured; closely covered with white pubescence; that on the median segment being the longer. On the centre of the pronotum is a complete yellow line, a little curved round at the edges; on the sides joined to the central line is a shorter, yellow mark, narrow at the base, widened gradually to near the apex, which again is slightly narrowed, broadly obliquely on the hinder side, more rounded on the outer and at the apex; yellow also is a line on the keel at the side of the apex of the scutellum; the post-scutellum, a thin line at its side, a mark in front of this, a somewhat oval mark on either side near the apex of the median segment, and a bullet-shaped mark on the mesopleuræ, near the tubercles. In the centre of the mesopleuræ is a furrow, obscurely crenulated at the base, widened and smooth at the apex. The base of the metapleuræ smooth and impunctate, except the space over the

coxæ, which has some large punctures; the rest coarsely punctured, at the apex running into reticulations. Legs ferruginous, the coxæ and the four hinder trochanters black; the hinder tarsi fuscous. Wings uniformly violaceous; the nervures and stigma black; at the top the second cubital cellule is only very slightly longer than the space bounded by the first recurrent and first transverse cubital nervures. Petiole slightly longer than the head and thorax united; the basal third almost impunctate; the rest strongly punctured; the part behind the tubercles distinctly narrowed; the tubercles indistinct; the second segment is closely and strongly punctured; the other smooth and shining; shortly beyond the middle of the petiole is an oval mark on either side; the apex is banded with yellow; in front of the middle and second segment is, on either side, an irregularly triangular mark; its apex is belted all round with yellow.

EUMENES ERYTHROPODA, *sp. nov.*

Niger, basi clypei, pronoto, scutellis maculis duobus, metanoto pedibusque rufis; alis violaceis. ♀.

Long. 15 mm.

Hab. Malacca.

Head coarsely punctured, the apex of the clypeus and the labrum smooth; the front and vertex thickly covered with long, fuscous hair; the clypeus and labrum with white depressed pubescence; black; the wedge-shaped space between the antennæ, almost the basal half of the clypeus, its apex and the labrum, rufous; the basal mark on the clypeus with two triangular expansions in its apex; the apex of the clypeus with a shallow, waved incision, the sides of which do not form teeth; the apex of the labrum rounded. The base of the mandibles broadly black; the rest rufous, slightly fringed with long, white hair; the palpi obscure testaceous. Antennæ black;

the basal two-thirds of the scape rufous. Thorax coarsely punctured all over; the prothorax rufous, except beneath; the scutellum with two closely joined marks; the post-scutellum, the sides of the metanotum, the apex of the metapleuræ, and a large mark—longer than broad, slightly narrowed on the lower side, and with all the sides straight—rufous. The median segment has a gradually rounded slope, the apical half being straight, oblique; the whole segment rather closely covered with long fuscous hair, and towards the apex with a white pubescence; the centre at the apex is excavated and projects (as seen from above) into triangular projections between the base of the abdomen. On the metapleuræ the rufous colour does not extend on to the lower side at the base. Legs rufous; the coxæ and trochanters black; the apices of the hinder tibiæ and the tarsi fuscous. Wings violaceous, lighter, almost hyaline, at the extreme base. Petiole as long as the rest of the abdomen; closely and coarsely punctured; at the base sparsely covered with longish, fuscous hair; the extreme apex with a narrow, rufous band; the second segment coarsely punctured; its apex depressed; the third and following segments impunctate; the ventral segments impunctate.

The only species with which it can be compared is the Ceylonese *E. humbertiana* Sauss., which is, however, very different; *e.g.*, the thorax is nearly as wide as long, the clypeus is smooth, and only ferruginous at the apex; there is only "a narrow, twice-interrupted line on the margin of the pronotum," the clypeus ends in two blunt teeth, &c.

PTEROCHILUS FULVIPENNIS, *sp. nov.* (Pl. 4, fig. 3, 3*a*, *b*.)

Hab. Poona (*Wroughton*).

Only one species of *Pterochilus* is recorded from India—*P. pulchellus* Sm., known from N. W. India. It, and the

species here described, may be separated as follows, apart from the oral characters noted below.

Black, the base of the abdomen red ; the wings hyaline, abdomen not pedunculate, length, 7—8 mm.

P. pulchellus Sm.

Fulvous, the head, pronotum and apex of abdomen broadly yellow ; wings fulvous ; abdomen pedunculate ; length, 24 mm.

P. fulvipennis.

Belongs to Saussure's first division : labial palpi large, not plumose, carrying only stiff hairs ; mandibles short ; abdomen pedunculate. Dark rufous : the head, except a transverse stripe on the vertex uniting the eyes, the pronotum, two marks near the apex of the second abdominal segment, and the four apical segments broadly, lemon-yellow ; wings fulvo-hyaline, the apex smoky ; the costa and stigma fulvous ; the nervures fuscous.

Antennæ fulvous, the scape lemon-yellow, except at the extreme apex ; bare except for a pale, microscopic down on the apical joints. Head lemon-yellow, shining ; the front and vertex bearing a short, pale pubescence ; a rufous band across the vertex behind the ocelli joining the eyes ; in the middle, it is prolonged to enclose the ocelli, from the sides of which runs a short, oblique line of the same colour. Mandibles dark rufous ; the teeth black ; on their apices are four short, distinct, blunt teeth ; the apical rounded ; the palpi rufo-testaceous ; the hairs long, stiff, pale. Clypeus bare ; bearing scattered, shallow punctures ; the apex with the sides almost straight, oblique ; the centre roundly incised, the incision at the sides ending in somewhat triangular, sharp teeth. Thorax rufous, except for a broad lemon-yellow mark on the pronotum ; the mark does not reach the apex of the segment and is bluntly rounded and narrowed at its apex. Mesonotum with scutellum densely covered with a fuscous, microscopic pile ; at the apex, touching

the scutellum, are two straight, distinct, moderately deep and wide furrows ; and opposite the apex of the tegulæ, but not reaching the scutellum, is a shorter more indistinct furrow. Scutellum flat, shining ; post-scutellum with a rounded slope ; its apex bordered by oblique furrows, which unite at the top with the wider and deeper furrow down the centre of the median segment. Pro- and mesopleuræ with a few scattered shallow punctures ; shortly behind the middle of the mesopleuræ is an oblique, moderately wide and deep, crenulated furrow, which unites with a narrower oblique crenulated one originating at the base of the mesopleuræ ; from the posterior part of the upper furrow runs a short, much wider and deeper, oblique furrow. At the base of the median segment is a crenulated, slightly oblique furrow, wide at the top, much narrower and more distinctly crenulated at the bottom. In front of the hinder coxæ are two stout teeth ; the hinder being narrower, sharper and longer than the anterior. Metapleuræ smooth, the middle aciculated ; the apex punctured ; the apical half of the median segment being also marked with punctures ; and rather thickly covered with longish, pale hairs. Legs coloured like the body ; the femora sparsely covered with longish, pale hairs ; the tibiæ and tarsi more thickly with pale pubescence. Second cubital cellule much narrowed at the top, being there slightly shorter than the space bounded by the second recurrent and the second transverse cubital nervures. Petiole elongate, slightly, but distinctly, longer than the second segment, becoming gradually wider from the base to the apex ; the apex with distinct punctures ; and having in the centre a deep, short, longitudinal furrow ; the lateral teeth, before the middle, large, triangular. Second segment obscurely punctured ; in front of the middle are two moderately large, transverse marks ; the third segment broadly lemon-yellow at the apex ; the base black, rufous at the sides ;

the fourth segment broadly yellow, a narrow, short, rufous line down the middle at the base, and a rufous mark on each side; the fifth segment broadly yellow, in the middle; the rufous triangularly projecting into it at the sides and at the base in the middle; the last segment broadly yellow; there is a transverse depression at the apex. The sides, base and apex of the lower side of the petiole smooth, impunctate, the rest with stout, slightly curved keels. The second segment, except in the middle, with shallow, rather widely separated, punctures; the other segments much more closely and strongly punctured.

What is no doubt a variety has the apex of the second abdominal segment broadly lemon-yellow, while in its centre, at the base, is a large, somewhat triangular, black mark, the narrow part of which is at the base; its fourth segment is black at the base.

Note.—This species may not be a true *Pterochilus*. The maxillary palpi are 6-jointed as in the typical species; but the labial are distinctly 4-jointed, whereas in *Pterochilus* proper they are 3-jointed only. On the basal joint of the labial palpi there are two or three hairs near the middle; and at the apices of the first, second, and third joints are two or three long, stiff, bristle-like hairs. The fourth joint is bare and is nearly half the length of the third. In addition to the four large apical teeth on the mandibles, there are two small ones and a much larger rounded one.

The number of joints in the labial palpi and their clothing do not appear to be features of generic importance. Saussure says (*Monog. des Guêpes*, iii., p. 321): “On remarque des espèces dont les palpes labiaux sont à peine comprimés et à peine plumeux; on aperçoit même parfois un quatrième article rudimentaire;” but in our species the fourth joint cannot be called “rudimentary,” being quite distinct.

ODYNERUS.

ODYNERUS EREBODES, *sp. nov.*

Niger, capite thoraceque distincte punctatis; abdominis segmentis 1-3 pallide flavo-balteatis; pedibus sordide rufis;

basi clypei scapoque antennarum subtus pallide flavis ; alis violaceo-fumatis. ♀.

Long. 9 mm.

Hab. Poona (*Wroughton*).

In Bingham's table (*l.c.*, p. 362) it comes in "a⁴. Third abdominal segment with a transverse yellow fascia on the middle of its posterior margin" which may now be subdivided as follows :

Scape of antennæ black ; tegulæ yellow, post-scutellum with a yellow spot on the angles, wings clear hyaline.

O. burmanicus Bing.

Scape of antennæ yellow beneath ; tegulæ entirely black ; post-scutellum impunctate, wings smoky. *O. erebodes*.

Head coarsely punctured ; the punctures large, round and deep ; black ; a large, curved band on the base of the clypeus, a small, heart-shaped mark between the antennæ, a line along the lower curve of the eye, and two small marks, longer than broad, on the apex of clypeus, pallid yellow ; mandibles black, the apex broadly piceous ; an elongate, yellow mark in the middle at the base ; this mark being sharply pointed at the apex. Palpi testaceous. Clypeus as long as its breadth in the middle ; the apex narrowed, the sides oblique ; the middle with a shallow, rounded incision, the sides of which form triangular teeth. The clypeus has a few shallow punctures and is densely covered with silvery pubescence. Front and vertex bearing large, deep, distinctly separated punctures ; the front very thickly, the vertex more sparsely, covered with silvery pubescence and hairs ; the eye orbits, on the lower side behind, thickly covered with silvery pubescence ; a little above the middle, there is a small, yellow mark. Antennæ covered with a white down ; the scape yellow beneath. Pro- and meso-notum with scutellum bearing all over deep, large punctures, those on the apical part of the mesonotum being the larger ; thickly covered with short fuscous pubescence,

the pronotum transverse in front, and bearing two short, yellow lines in the middle; the post-scutellum coarsely rugosely punctured, thickly covered with black hair; the sides oblique, the middle depressed; the median segment with an oblique slope, the centre not excavated; in the middle deeply furrowed. Pleuræ coarsely punctured like the mesonotum, the punctures on the metapleuræ towards the apex running into reticulations. Legs dark rufous; the coxæ blackish; the femora and tibiæ in front blackish; the extreme apices of the femora yellow; the four hinder tibiæ with a yellow line in the middle in front; the tarsi infuscated. The wings are lighter in tint behind and at the base; the nervures and stigma black. Abdomen with the basal segment behind and at the sides, the second with the apex all round and the third with a band in the centre, pale yellow; the basal segment rounded at the base; sparsely punctured; the second segment strongly punctured; the third still more strongly, the puncturing on the other segments becoming gradually weaker; the basal segment yellow, suffused with blood-colour beneath.

ODYNERUS WROUGHTONI, *sp. nov.*

Long. 8 mm.

Hab. Poona (*Wroughton*).

In Bingham's table (*l. c.*, p. 362) it comes in at "a². Base of 1st abdominal segment red; a³. abdomen petiolate" which will now be sub-divided:

Median segment not reticulated at the base and with a carina on either side; the three apical segments of the abdomen not marked with white in the centre above.

O. miniatus Sauss.

Median segment reticulated at the base, without a keel on either side; the three apical segments of the abdomen marked with yellow in the middle.

O. wroughtoni.

The antennæ black; the scape clear yellow; the flagellum brownish beneath; the flagellum bearing a

sparse, white, microscopic pile. Head coarsely punctured, sparsely covered with short, white hair; the hinder ocelli in large deep pits. The centre of the clypeus black, except the apex, which is red; this black and red part coarsely and strongly punctured; the black narrowed at the base and not keeled laterally; but the rest is bordered by distinct, reddish, straight keels which converge slightly towards the apex, which is transverse; its sides, except at the apex, yellow; and punctured on the outer side. Mandibles red, yellow at the base; the palpi yellow; above the antennæ is a yellow mark, mitre-shaped, except that it is roundly produced beneath. Thorax black; two large marks on the middle of the pronotum—narrow at the base, wide, and oblique at the apex, the post-scutellum, and a somewhat pyriform mark, below and in front of the tegulæ, yellow. Pro- and meso-notum with the scutella strongly punctured; the base of the median segment in the centre reticulated, densely covered with white pubescence, especially at the centre of the base, where it almost hides the surface. Pro- and meso-pleuræ strongly punctured, covered with silvery hair; the metapleuræ apparently impunctate, the surface hidden by silvery pubescence. Tegulæ yellow, reddish in middle. Wings hyaline; the nervures and costa blackish; the stigma fuscous; the second cubital cellule at the top narrowed, being there not much wider than the space bounded by the first transverse cubital and the first recurrent nervures. Legs red, the tibiæ yellow on the outside, this being also, to a less extent, the case with the tarsi at the base. Petiole red; yellow at the apex above; shining, punctured towards the apex; the second segment obscurely punctured at the base, more strongly towards the apex; an oval, irregular spot on either side near the apical third; its apex with a moderately broad, yellow band, slightly dilated at the sides, and at the middle; the 3—5 segments

more strongly and closely punctured ; on the apex of the third segment in the middle are two small, yellow marks ; on the fourth segment in the centre is a much larger mark, transverse at the apex, contracted in the middle at the base and with the sides rounded ; on the apex of the last segment is a larger yellow mark rounded at the base, the apex roundly projecting in the middle. Beneath, the basal segment is red ; the apex of the second, yellow.

VESPIDÆ.

ICARIA JUCUNDA, *sp. nov.*

Long. 15 mm. (worker).

Hab. New Guinea (*Cuthbertson*).

Agrees closely in size, form and coloration with *I. ferruginea* ; but may be known from it by the scutellum and post-scutellum being furrowed down the centre ; by the middle of the median segment being much more strongly and broadly transversely striated, by the petiole being longer, by its narrowed basal half being narrower compared with the apical and more distinctly separated from it ; by the yellow band on the second abdominal segment being much narrower and by the wings being much lighter in tint, their apex being only lightly infuscated.

Several species of *Icaria* are known from New Guinea and the neighbouring Islands ; but the present species does not agree with any of them. Smith's catalogue (*Proc. Linn. Soc. (Zool.)*, 1869) is not trustworthy. In *Icaria* there are several noteworthy omissions ; *e.g.*, *I. festina* Sm., *I. bicolor* Sm. (*Proc. Linn. Soc. (Zool.)*, 1864, *p.* 90), from New Guinea, and *I. australis* Sauss, from Dorey.

Rufo-ferruginous ; the apex of the clypeus all round, the base of the mandibles broadly, the edge of the thorax all round in front, scutellum, post-scutellum, two moderately large, oblique marks on the apex of the median

segment, a large mark on the base of the mesopleuræ immediately under the wings, a more obscure one above the middle coxæ, a narrow line on the apex of the petiole and the apical fourth of the second segment above and the apical eighth below, yellow. Head coarsely, but not very distinctly, punctured; the front and vertex sparsely covered with a short, sparse, pale pubescence; the face with the pubescence much thicker and with a fulvous hue; the clypeus covered with long, bright golden hairs. Antennal fovea deeply furrowed in the middle above. Sides of the clypeus straight, oblique, its centre not ending in a point or tooth. Mandibles ferruginous, the teeth black; a large, somewhat triangular, yellow mark on the base above, its apex reaching beyond the middle. Antennæ ferruginous, the scape somewhat darker in tint; the flagellum, especially towards the apex, densely covered with a white down. The edge of the pronotum sharply carinate. Pro- and meso-notum coarsely punctured, running into obscure reticulations towards the apex; the edge of the pronotum narrowly depressed, the depression forming a furrow and black. Scutellum and post-scutellum rather strongly, but not closely, punctured; the central furrow on the scutellum deep, shining, rufo-piceous; that on the post-scutellum broader but not quite so deep. Median segment with an oblique slope; its centre appearing raised through being transversely striated, and bordered by a distinct margin or furrow; the centre at the apex deeply excavated, and with a distinct furrow in the middle. Pro- and mesopleuræ coarsely punctured. The base of the metapleuræ strongly, coarsely and irregularly longitudinally striated, bordered behind by a black furrow, and below by a short, oblique, shining furrow, from which a curved, not very distinct, furrow runs to the hinder coxæ. Legs ferruginous; the coxæ densely covered with fulvous pile, especially at the base on the under side. Wings hyaline, the costal and

radial cellules smoky; the stigma flavo-testaceous; the nervures blackish. Petiole elongate, the basal third distinctly narrowed and separated from the rest; the narrow yellow apex being also slightly narrowed; shining, impunctate; towards the apex thickly covered with depressed, fulvous hair. The other segments closely and rather strongly punctured, particularly the third and following.

ICARIA CEYLONICA, *sp. nov.*

Long. fere 9 mm. (worker).

Hab. Periyakullam, Ceylon (*Yerbury*).

In Bingham's table (*l.c.*, p. 386), this species can be referred to "A. Reddish or reddish-brown, with yellow markings," and to subsection "a. second abdominal segment with no transverse yellow band on its apical margin," which will now be subdivided:—

Head and thorax rufous; abdomen black; hind legs for the greater part black. *I. guttatipennis.*

Entirely rufous, except the second abdominal segment, which is infuscated; legs without black. *I. ceylonica.*

Head reddish, sparsely covered with short, glistening white pubescence; the front and vertex with moderately large, rather widely separated punctures, the ocellar space fuscous; the antennal tubercle bare; furrowed above; the clypeus almost bare at the apex, its sides oblique, the middle ending in a tooth, and with some large punctures; at the base of the mandibles is a black spot. Scape of antennæ rufous, infuscated above; the flagellum paler, infuscated above, especially towards the apex. Pro- and meso-notum with shallow, rather large punctures all over; the mesonotum darker in tint, thickly covered with a microscopic, white pile; the base of the post-scutellum black, obscurely crenulated; the median segment with a large, wide, deep, black depression in the middle; the depression becoming gradually, but not very greatly, nar-

rowed towards the apex; its centre itself has a furrow, and it is obscurely transversely striated. Pleuræ somewhat infuscated except at the base of the pro- and the middle of the meso- above; the mesonotum black. Legs pale rufo-testaceous, the tarsi paler; the hinder coxæ black beneath; the fore femora slightly, the four hinder more broadly, lined with black beneath. Wings hyaline; the apex with a blackish cloud extending from the second transverse cubital nervure to the apex; dark in the radial cellule, more obscure in the cubital; the nervures blackish; the stigma testaceous; darker along the upper border. Petiole with a distinct, narrow neck, from which it becomes gradually wider to the apex, which has a narrow, pale border; the second segment has the basal three-fourths or so obscure black, except on either side at the base; the third segment is blackish at the base; the fourth and fifth at the apex, laterally, the apical segments thickly covered with white hair. On the ventral side the apical four segments are black.

ANTHOPHILA.

COLLETIDÆ.

COLLETES DENTATA, *sp. nov.*

Long. 11—12 mm. ♀ et ♂.

Hab. Poona, Bombay (*Wroughton*).

The only Indian species of *Colletes* may be separated from the present as follows:—

Vertex with “a few fine punctures”: the median segment at base longitudinally rugose, the apex with the sides smooth. *C. dudgeonii* Bng.

Vertex coarsely punctured, the median segment strongly reticulated; the sides of the apex transversely striated.

C. dentata.

Clypeus apparently closely and rather strongly punctured, but the surface cannot be properly observed from the matting of the hairs; the front and vertex

strongly punctured; thickly covered with long, white hairs; a straight, narrow furrow runs from the ocelli to the antennæ; the hair on the sides longer and thicker than on the vertex. The scape of the antennæ covered with longish, stiff, black hairs; the flagellum glabrous. Thorax black; the pro- and meso-notum and scutellum strongly punctured; the pronotum thickly covered with long, white hair. The edges of the pronotum on either side project into a large, sharp plate, the base of which projects into a sharp, triangular tooth. Metanotum at the base with a strongly reticulated area, which, at the apex, is narrowed and runs into a wide, deep, and smooth furrow, slightly narrowed towards the apex and bordered by stout keels; on either side of this furrow it is smooth; on the outer side it is apparently punctured, but the punctuation, if present, is hidden by a thick covering of long, white hair. Propleuræ almost impunctate, at the apex thickly covered with long, white hair; the mesopleuræ coarsely punctured, the punctures large and clearly separated; an obscure, vertical furrow down it behind the tubercles, and an oblique, longitudinal one above the middle; the metapleuræ finely and closely rugose; a few oblique, short keels above the coxæ. Legs black; the calcaria pale; the femora sparsely covered with longish, white hair; the tibiæ and tarsi thickly with shorter pale hair, which has on the tarsi a fulvous tint. Wings dark fuscous, with a violaceous tinge; the base paler, the apex from the end of the radial cellule hyaline; the stigma and nervures black. Abdomen smooth, almost shining; all the segments fringed with a dense band of depressed, white pubescence; except the last, which is closely punctured; the apical three segments sparsely covered with black hair; the ventral segments fringed with white pubescence; the hypopygium very smooth and shining; its sides at the apex fringed with long, white hair.

If Bingham's fig. 127 (*l.c.*, p. 408) represents the labium of *C. dudgeonii*, then that of the species here described differs from it in the labium being much wider than the mentum, and more widely and deeply divided at the apex. The same remark applies to Smith's figure (*Cat. Hym. Ins.*, i., pl. I., f. 1). Bingham makes no mention of the fore wings having an appendicular cellule, nor is one indicated in his figure. In *C. dentata* the appendicular cellule is quite distinct, but open at the apex. The head and thorax are not very pubescent for a *Colletes*, but this may be through wear and tear. The wings vary in tint.

APIDÆ.

HALICTUS TORRIDUS, *sp. nov.*

Long. 5-6 mm.

Hab. Poona (*Wroughton*).

In Bingham's table (*l.c.*, p. 421) it comes in at "*C.* Enclosed space at base of median segment with longitudinal striæ. *b*¹. Abdomen impunctate," which contains two species;—*H. timidus*, which differs in having the abdomen and legs rufo-testaceous, and the Burmese *H. guttuerosus*, which differs in having the eyes only very slightly convergent below; while here they are very distinctly convergent below; the pubescence on the head and thorax is "thin;" here it is dense and long.

Head closely and distinctly punctured in front; the clypeus thickly covered with depressed, white pubescence; the front, vertex, and hinder parts with the hair longer, more erect, and not quite so dense; eyes distinctly converging on the lower side, the space separating them there being about half the length of the vertex; they have a distinct curve near the top on the inner side. The face, below the antennæ in the centre, projects; the projection being wider at the apex, where it is clearly separated from the clypeus, which is as long as the space between its base and

the antennæ; its sides oblique, very slightly rounded towards the apex, which is transverse; the sides of the apex rounded; not so closely punctured as the front, but the punctures are as large. Antennæ as long as the head and thorax united; black; the scape with longish, white hair; the flagellum with a close down, which is especially thick on the lower side, giving it a fuscous appearance. Thorax shining, thickly covered with long, soft, white hair; the mesonotum and scutellum with shallow, not very large punctures; the apex of the median segment with an oblique slope; the enclosed space at the base finely rugose, the sides with some nearly straight, longitudinal striæ; the propleuræ almost impunctate; the mesopleuræ closely and rather strongly punctured; shining, sparsely covered with long, white, soft hair; the depression at its base wide, deep; the part above it bounded by narrow, oblique furrows, which converge slightly towards the top. Legs thickly pilose; the hair on the femora and tibiæ long and white, that on the tarsi very dense, pale golden. Wings clear hyaline; the nervures pale; the stigma darker at top and bottom; the second cubital cellule narrowed at the top; it is there half the length of the third at the top; the first transverse cubital nervure straight, oblique; the second and third curved; the first recurrent nervure is interstitial. Abdomen shining, impunctate; the apical segments sparsely covered with long, white hair. The first submedian nervure is interstitial.

ANDRENA EXAGENS Walker.

This bee, described by Walker, *Ann. Mag. Nat. Hist.*, 1860, from Ceylon, is omitted by Bingham.

SUDILA, *gen. nov.*

Head in ♀ elongate, narrower than the thorax; in ♂

broader than it, largely developed behind the eyes; the apex of the clypeus in ♂ produced into two stout teeth; the sides of the head, on the lower side behind, largely triangularly produced. Labial palpi 4-, maxillary 6-jointed; the first joint of maxillary half the length of the 2nd; the 2nd to 5th almost equal in length; the 6th a little longer. Mandibles in ♂ very large, curved, dilated towards the apex, which is itself prolonged into a long, stout tooth issuing from the middle of the dilated part; the middle with a long furrow in the centre. Labrum at top ending in a triangular point; the maxilla moderately large; the 2-5 joints almost equal in length, the 6th joint a little longer than the first. Body in ♀ and ♂ moderately, the legs densely, pilose; the claws with a stout tooth in the middle. Mesonotum with a narrow, but distinct, furrow down the sides, but not reaching the base or apex, and a less distinct, shallower furrow down the middle. Median segment without a distinct enclosed or striated space in the centre at the base. Prothorax transverse at the top, sharply raised there and at the sides. Pterostigma moderately large and elongate; the first cubital cellule somewhat longer than the second and third cellules united; the third cubital cellule narrow, not much more than half the length of the first; the first recurrent nervure almost interstitial; the second received close to the third transverse cubital nervure. Abdomen smooth and shining; the apical segments densely covered with long hair; the ventral segments densely fringed with long hair; the apical segments with a rima, as in *Halictus*.

The presence of a rima on the apical abdominal segment and the form of the alar neuration ally this genus to *Halictus*, nor is the structure of the trophi enough to separate it generically from that genus, while the ♀ again agrees with it in having an elongated face; the median segment in both sexes wants the enclosed space at the

base; so that the absence of the enclosed space on the median segment, and, more particularly, the presence of the longitudinal furrows on the mesonotum, which are not found, so far as I know, in *Halictus*, are the only points of distinction between them so far as regards the females. On the other hand the form of the head in the ♂ is so very different from what it is in *Halictus*, or indeed in any allied genus, that it cannot be included in it.

SUDILA BIDENTATA, *sp. nov.* (Pl. 4, f. 5, 5a.)

Nigra, nitida, sparse pallide hirta; alis hyalinis.

Long. fere 10 mm.

Hab. Ceylon (*Rothney*).

♂. Head shining, impunctate, sparsely covered with long, fuscous-black hair; a narrow, but distinct, furrow runs from the ocelli, which are bordered behind by a wider and deeper furrow. Mandibles piceous-red, except at the base and apex. Scape of antennæ sparsely covered with long black hairs; the base of the flagellum with short, stiff hairs; the rest of it bearing a pale down. Prothorax almost glabrous; its basal edge piceous; the mesonotum and scutella sparsely covered with long, black hairs. Median segment with a gradually rounded slope; its apex covered with long, white hairs. Mesopleuræ and mesosternum shining, impunctate, sparsely covered with long, white hairs. On the mesopleuræ, near the top, is a wide, oblique, deep furrow, which reaches near to the apex. Wings hyaline, the nervures and stigma black; the first transverse cubital nervure is oblique, straight; the second slightly, the thirdly distinctly, curved. The hair on the legs thick, longish, white on the femora, much thicker and darker coloured on the tibiæ and tarsi; the spurs and claws reddish. Abdomen very smooth and shining, the base glabrous, the apex thickly covered with long, stiff, fuscous-black hairs; the apical ventral segments thickly covered with long, fuscous hairs.

SUDILA FUSCIPENNIS, *sp. nov.*

Long. 10 mm. ♂.

Hab. Ceylon (*Rothney*).

This species differs markedly from the preceding in the form of the head; it is not so shining; the apex of the clypeus, instead of ending in the middle in two sharp teeth, has only a semicircular incision, the edges of which do not project; the lower part of the head at the sides has the projecting part not quite so lengthened, and is sharper pointed at the apex; the apex of the mandible is rounded in *S. bidentata*, here it is distinctly transverse and not so much narrowed; another marked distinction is found in the median segment; here its sides are bordered by a furrow, which is hardly visible in the other; the legs are distinctly fuscous, or rather piceous; the wings are distinctly smoky, being much darker coloured than in *S. bidentata*; the second cubital cellule is perceptibly shorter above and beneath than the third; the two being consequently together shorter than the first; the second transverse cubital nervure is straight, more oblique and more narrowed towards the first at the top.

If I had only *S. bidentata* to deal with, I should have inferred that the female described below was its female; but having two undoubted males of distinct species, I am unable to say to which of them it belongs, if indeed it may not pertain to a third unknown male. I therefore am compelled to treat it as a separate species.

SUDILA CEYLONICA, *sp. nov.* (Pl. 4, fig. 4.)

Nigra, nitida, sterno pleurisq̄ue longe albo-hirtis; alis hyalinis, stigmatē fusco, nervis nigris. ♀.

Long. 10-11 mm.

Hab. Ceylon (*Rothney*).

Front and vertex sparsely covered with longish black hair; the front opaque, shagreened; a distinct, narrow

furrow runs down from the ocelli; the clypeus very shining, bearing some large, deep, widely separated punctures; its apex with two large, oval foveæ in the centre, and fringed with long, reddish-fulvous hair, as is also the labrum. The apex of the mandibles piceous, fringed at the base with a few long, fulvous hairs. Flagellum shining, sparsely covered with a few black hairs. Pronotum at the sides above triangular; the angles sharp; the propleuræ excavated, shining, impunctate, glabrous; the mesonotum shining, impunctate; thickly covered with fuscous hair, the hair on the sides to the tegulæ much thicker and paler; the middle towards the base with a shallow, not very distinct, furrow; and there is on either side, extending from in front of the tegulæ to the scutellum, a narrow, more distinctly defined furrow; scutellum and post-scutellum impunctate, thickly covered (especially the post-scutellum) with long, fuscous hair. The base of the mesopleuræ thickly covered with long, pale hair, the rest of it with the hair sparser. Median segment shagreened, the base without any enclosed or punctured space; sparsely haired; the apex thickly covered with long, white hair. Tegulæ very shining, impunctate. Wings hyaline; the nervures dark fuscous. Legs, especially the hinder, covered with long, white hair; the hair on the hinder tarsi very thick and long, and having a faint fulvous tinge. Abdomen shining, smooth; the base with a few scattered hairs; the apex thickly covered with long, fuscous hair; the ventral surface covered thickly with long, pale hair.

STEGANOMUS FULVIPENNIS, *sp. nov.*

Long. 7 mm.

Hab. Poona, Bombay (*Wroughton*).

The two new species here described may be separated

from *S. nodicornis* Sm., the only known Indian species of the genus, by the under-noted characters:—

Scape of the antennæ rufous, wings with the apex distinctly smoky; the basal area of the median segment only impunctate.

S. nodicornis.

Scape of the antennæ black; wings not smoky at the apex; the base of the median segment impunctate.

S. fulvipennis and *S. gracilis.*

Black; the antennæ, except at base and apex, the femora, tibiæ, and tarsi rufo-testaceous; wings hyaline, the stigmal region slightly smoky; the stigma testaceous, the nervures at the base pale testaceous, darker towards the apex of the wings.

♂. The scape of the antennæ black, bearing long, white hair; the second joint infuscated; the flagellum almost bare, finely punctured; the terminal joint black; the fourth joint is slightly longer than the third. Head black, the front, cheeks, and clypeus densely covered with pale fulvous hair; the front very closely punctured; the vertex at the sides of the ocelli with large, clearly separated punctures; the part behind the ocelli closely punctured, the punctures slightly larger and more distinctly separated than those in front of the ocelli, and much smaller than those on the sides. The pro- and meso-notum thickly covered with short, fulvous pubescence, this being also the case with the scutellum and base of post-scutellum; the latter is minutely and closely punctured. Median segment shining, almost bare; the base impunctate, the rest with moderately large, distinctly separated punctures; the apex with an indistinct, shallow furrow down the centre. Propleuræ impunctate, slightly shagreened; bare; mesopleuræ strongly punctured, densely covered with long, pale hair; the metapleuræ sparsely covered with long, pale fulvous hair and strongly punctured. Legs fulvous; the coxæ, trochanters, and base of four anterior femora black;

the femora on the lower side fringed with white hair; the tibiæ and tarsi thickly covered with white pubescence. The first recurrent nervure is received at a slightly less distance from the base than is the second from the apex of the cellule. Abdomen black, the ventral segments more or less ferruginous, the dorsal segments with broad belts of white, depressed pubescence at their bases, all the segments strongly and closely punctured, except at their extreme bases and apices.

The ♀ has the flagellum of the antennæ black above; the abdomen above much less strongly punctured; the legs thickly covered with long, fulvous hair; and the basal abdominal segments fringed with golden hair; the apical covered densely all over with pale, golden hair.

STEGANOMUS GRACILIS, *sp. nov.* (Pl. 4, f. 16.)

Long. 6 mm. ♂.

Hab. Mussooree (*Rothney*).

Agrees with *S. fulvipennis* in having the base and apex of the antennæ black and the apex of the wings not smoky; but is smaller and more slender, the third joint of the antennæ is not distinctly shorter than the fourth, the median segment is impunctate, the second recurrent nervure is received at a distinctly greater distance from the apex than is the first from the base of the cellule; and the abdominal segments are very much less strongly punctured.

Antennæ slender, testaceous, the apical two joints black; the scape broadly infuscated in the middle; punctured, sparsely covered with long, white hair. Front and oral region densely covered with pale fulvous pubescence; the vertex much more sparsely covered with longer hair, uniformly, but not very strongly, punctured. Mandibles broadly ferruginous in the middle. The base and apex of the mesonotum, the scutellum and

post-scutellum densely covered with pale, fulvous pubescence; the centre much more sparsely with shorter, darker pubescence, and closely and minutely punctured. Median segment very shining, the base impunctate, the rest with minute, scattered, shallow punctures. Propleuræ impunctate, glabrous; the basal three-fourths of the mesopleuræ covered thickly with pale fulvous hair; the apex and the metapleuræ sparsely covered with long, pale fulvous hair. Legs: the coxæ, trochanters, and the greater part of the femora, black; the tibiæ and tarsi rufo-testaceous; the femora sparsely, the tibiæ and tarsi very thickly covered with long, white hair, almost hiding the colour. Abdomen black, the ventral surface for the greater part ferruginous, the basal four segments closely punctured, fringed at the base with white hair; the apical segments impunctate, clothed with soft, white hair; the penultimate ventral segment is depressed in the middle, and with two large tubercles on either side. Wings hyaline, the stigma testaceous, the nervures blackish, the recurrent nervures are received about the same distance from the base and apex of the cellule.

NOMIA AUREOHIRTA, *sp. nov.* (Pl. 4, f. 7.)

Long. 10 mm. ♂.

Hab. Poona (*Wroughton*).

In Bingham's table (*l.c.*, p. 448), this species comes into *b. a.*² and into a new section *C*⁴:—Enclosed space at base of median segment transversely striated. In the form of the hinder femora in the ♂ it resembles *N. fervida*; but the form of the tibiæ is different; in *N. fervida* it is broadly dilated in the middle; in the present species there is no dilatation, but a gradual curve from the base to the apex; the under side of the femora also is straight to the keel, while in *N. fervida* the base is curved inwardly and the middle dilated slightly.

Head below the antennæ thickly covered with moderately long, golden pubescence; the front and the occiput thickly with longer, dark fulvous hair; the vertex rugosely punctured, sparsely covered with darker hair. Mandibles on the lower side with some long, fulvous hairs; black, piceous near the apex; the hinder orbits thickly covered with pale fulvous hair. Antennal scape lemon-yellow; thickly covered with long, fulvous hairs; the flagellum punctured, rufo-fulvous, darker above. The collar covered with depressed, yellow pubescence, behind fringed with long, dark fulvous hair; the mesonotum and scutellum thickly covered with a short, depressed, dark fulvous pile completely hiding their texture; the post-scutellum with a similar covering, but longer, and intersected with some fuscous hairs. The basal area on the median segment triangularly dilated in the middle at the apex; the middle at the apex with some short, transverse striæ; the sides obscurely striated. Mesopleuræ thickly covered with fulvous hair; more sparsely at the apex, perhaps through being rubbed; the metapleuræ covered with long, fulvous hair above. Legs, except the coxæ and trochanters, lemon-yellow; the femora and tibiæ at the base suffused with ferruginous; the fore tarsi fringed behind with long, pale fulvous hair; the hind femora semicircularly curved above, straight on the lower side, and with a small, oblique tooth near the apex; the tibiæ produced, at the apex in front, into a somewhat triangular projection which is gradually widened from the base of the tibiæ to the apex, the apex itself being rather acute. Wings with a fusco-fulvous tinge, darker at the apex; the stigma obscure fulvous; the second cubital cellule at the top about two-thirds of the length of the top of the third; the first recurrent nervure is received in the apical third of the cellule. The basal segment of the abdomen, broadly at the apex, and the second and third segments, in the

middle, thickly covered with fulvous hair; the apices of the first to fourth segments with a broad band of rich fulvous, depressed pubescence; the two apical segments thickly covered with long, pale fulvous hair. The ventral segments fringed at the apex with pale hair; the last deeply depressed in the middle, and having there a stout triangular projection.

NOMIA ERYTHROGASTER, *sp. nov.* (Pl. 4, f. 10.)

Long. 9-10 mm. ♂.

Hab. Poona (*Wroughton*).

Comes into Bingham's Section A (*l.c.*, p. 448).

"*a.* Scutellum armed with two spines or teeth posteriorly," and "*b.* Abdomen beneath and posterior legs rufo-testaceous," which is now subdivided:—

Apex of post-scutellum distinctly bidentate; the second cubital cellule not one-half the length of the third on the top. Length, 7-8 mm. *N. westwoodi.*

Apex of post-scutellum not distinctly bidentate; the second cubital cellule more than one one-half the length of the third on top. Length, 10 mm. *N. erythrogaster.*

Head in front from near the ocelli thickly covered with white hair, that over the antennæ being much the longer; the vertex closely, but not deeply, punctured. Mandibles obscure ferruginous before the apex. The centre of the clypeus with a narrow keel; above this is a stouter keel reaching to the antennæ. Scape of antennæ covered above with long, white hair; the flagellum obscure brownish beneath. Mesonotum uniformly covered with shallow punctures; alutaceous; the base, sides, and apex thickly covered with white hair; the scutellum similarly punctured to the mesonotum, but with the punctures somewhat larger; the apex with the middle slightly depressed; post-scutellum thickly covered with white hair; the apex armed with two large, flat, slightly con-

verging teeth, which project backwards and are a little narrowed at the top. The basal area on the median segment long and narrow, bearing stout, longitudinal keels, widely separated in the middle, closer together at the sides. The sides of the median segment are strongly, but not closely, punctured, and covered with long, white hair. Pleuræ rugosely punctured, thickly covered with white hair. Wings hyaline, the costa and nervures fuscous; the second cubital cellule at the top half the length of the top of the third; the recurrent nervures are received in the apical third of the cellules. Legs thickly covered with white hair; the hind femora and tibiæ red, except the apex of the femora above, which is black; the hind femora dilated above; the apex of the hind tibiæ gradually dilated to the apex, the dilation a little longer than broad, transverse at the apex, with the sides rounded. Abdomen shining, impunctate, marked with four greenish blue belts; the ventral surface, except at the apex, rufous; the apex of the segments pale, thickly fringed with white hair.

NOMIA PURPUREO-LINEATA, *sp. nov.* (Pl. 4, f. 15.)*

Long. 10 mm. ♀.

Hab. Barrackpore (*Rothney*).

In Bingham's table (*l.c.*, p. 458), this species fits into "b, b¹. Thorax with griseous or white pubescence," and "a³. Clypeus with a medial vertical furrow," which now stands as follows:—

Clypeus coarsely punctured; abdominal segments 2-4 with blue or green transverse lines, wings hyaline.

N. iridescens Sm.

Clypeus coarsely longitudinally striated; abdominal segments 1-5 with purple transverse lines; wings deeply fuscous except at extreme apex. *N. purpureo-lineata*.

* This group (that of *N. chalybeata* Sm.) forms the sub-genus *Paranomia* Friese.

Antennæ black; the flagellum obscure brownish beneath, bare; the scape with a few long, white hairs. Face elongate; keeled down the middle of the clypeus, closely longitudinally striated from the antennæ to the apex of the clypeus; the labrum smooth, shining, fringed at the apex with long, golden hair. Mandibles entirely black; the base with some long, white hairs. Front and vertex closely punctured; the sides, behind the antennæ, thickly covered with short, pale golden hair. Mesonotum alutaceous, closely punctured; an indistinct furrow down the sides; the scutellum punctured like the mesonotum, slightly depressed in the middle. Post-scutellum thickly covered with pale fulvous pubescence. The basal area on the median segment extending from side to side; sharply keeled at base and apex; irregularly longitudinally striated; the segments from the area thickly covered with long, pale fulvous hair, and bearing large shallow punctures. Pleuræ shagreened; the mesopleuræ punctured, thickly covered with long, pale fulvous hair. Legs entirely black, except the claws, which are piceous; thickly covered with pale pubescence. Wings fuscous, tinged with fulvous; the costa and stigma black; the nervures fuscous; the second cubital cellule hardly narrower at top than at bottom; at top slightly more than one-half the length of the top of the third; the first recurrent nervure is received quite close to the transverse cubital. Abdomen shining, very minutely punctured; all the segments with a smooth belt of purple at their apices; the base of the petiole covered with longish, pale golden hair; the others at the base sparsely covered with long, black hair. Ventral segments obscure brownish; shining, the apices of the segments pale.

A very distinct species, easily separated by the violaceous bands on the abdomen and by the fuscous wings.

NOMIA LATISPINA, *sp. nov.* (Pl. 4, f. II ♀, III a. ♂.)

Long. 7 mm.

Hab. Allahabad (*Rothney*).

Comes into a new section on foot of p. 448 (*l.c.*); C⁴. Enclosed space at base of abdominal segment smooth, neither punctured nor striated; apices of abdominal segments strongly punctured.

Head narrow, sharply oblique behind the eyes; the front and vertex with large, widely separated punctures; the front thickly, the vertex more thinly, covered with fulvous hair; the face and clypeus thickly with shorter, cream-coloured pubescence; the apex of the clypeus bare, rather strongly punctured; the mandibles shining, broadly rufous in the middle. Antennæ entirely black, except the flagellum on the under side, which is brownish; the scape bearing long, white hair. Thorax sharply transverse in front; the mesonotum thickly covered with depressed, scale-like, fulvous hair; the scutellum with only a few hairs; the post-scutellum covered thickly with long, pale fulvous hair. Mesonotum closely, rather strongly and uniformly punctured; the scutellum with the punctures, if anything, larger, and more widely separated. Median segment shining; the sides and apex with a few pale golden hairs; the basal area smooth, impunctate, triangular; the rest of the segment bearing large, deep, distinctly separated punctures. Meso- and meta-pleuræ thickly covered with pale fulvous hair. Legs black; the anterior tibiæ and base of tarsi rufous in front; the hinder tibial spine and metatarsus white; the hinder tibial process reaching to the apex of the metatarsus, very broad, not much narrowed towards the apex, which is rounded. The hinder tibiæ with a distinct, narrow keel down the middle on the outer side; the hinder femora largely dilated, becoming wider to near the apex, which is oblique on their under side; in the middle, near the apex, is a small

triangular tooth. Wings hyaline, the stigma and nervures black; the second cubital cellule small, shorter than broad; the first transverse cubital nervure straight; the second roundly curved, interstitial with the recurrent nervure. Abdomen shining, strongly punctured; the punctures large and deep on the basal three segments; the apex of the basal segment with long, fulvous hair; the base of the second, third and apical segments entirely covered with grey pubescence.

The form of the ♂ hind legs resembles that of *N. chalybeata* Sm. as figured by Smith (*Trans. Ent. Soc.*, 1875, pl. 11, f. 5).

NOMIA FULVOHIRTA, *sp. nov.* (Pl. 4, f. 9.)

Long. 12 mm. ♂.

Hab. Allahabad (*Rothney*).

Comes into Bingham's Section (*l.c.*) "*A. b.* Post-scutellum unarmed posteriorly. *a*¹. Thorax with more or less fulvous pubescence," consisting of *N. curvipes* Fab., the ♂ of which differs in having the hinder femora "rufopiceous, with their apical-half yellow," here black, yellow at the apex, and the hinder tibiæ are broadly black at the base; *N. chalybeata* differs from it in having the femora not so much swollen nor toothed; *N. varipes* Cam. agrees with it closely; but may be separated by the rufous, not black, base of the hinder femora and by their having only one large tooth.

Head, except on the sides of the vertex, densely covered with long, fulvous hair; the vertex, except near the ocelli, bearing rather large, distinctly separated, punctures; the base of the mandibles yellow, the middle piceous, the apex black. The scape of antennæ yellow, except on the apex above; the flagellum fulvous, black above to near the apex. Thorax densely covered with long, fulvous hair; the basal area of the median segment

bearing stout, longitudinal keels. Legs yellow, thickly covered with fulvous hair; the coxæ, trochanters, the basal three-fourths of the four anterior femora and the basal half of the posterior femora, black; the hinder femora largely thickened; on the lower side near the apex are two stout teeth, separated by a semicircular space, the inner tooth being the larger; the teeth are black, as is also the under side of the femora. Hinder tibiæ greatly dilated towards the apex, ending there in a large curved, triangular tooth. Wings hyaline, with a slight fulvous tinge; the apex, from the radial cellule, infuscated; the costa, stigma and nervures fulvous; the second and third cubital cellules at the top are equal in length. The basal segment of the abdomen black; the apex greenish-yellow; strongly punctured; the base at the sides covered with short, the middle with long, fulvous hair; the second and third segments black, the apices greenish-yellow; the other segments greenish-yellow; the base of all the segments covered with fulvous pubescence; the apices glabrous; the ventral segments castaneous.

NOMIA VARIPES, *sp. nov.* (Pl. 4, f. 8.)

Long. 10 mm. ♂.

Hab. Allahabad (*Rothney*).

In Bingham's table (*l.c.*, p. 448), this species comes into "A. Abdomen with non-pubescent transverse fasciæ," and "b. a¹. Thorax with more or less fulvous pubescence," "a². Legs rufo-fulvous or ferruginous," presently represented by *N. chalybeata* Sm. and *N. curvipes* Fab., from either of which it is very different; from *N. chalybeata* by the abdomen not having blue-green fasciæ and by the spined femora; from *N. curvipes* by the femora having a large projecting tooth and not a semicircular incision, and by the apical projection on the hinder tibiæ being broader and blunter, not ending in a sharp curved tooth.

The form of the hinder femora and tibiæ most nearly resembles those of the Indian *N. combusta* and the African *N. calida*, but otherwise it is very distinct. The femora are formed pretty much as in *N. chrysopea*, but otherwise there is no resemblance.

Head black; front and vertex strongly punctured; sparsely covered with short, fuscous hair; a smooth furrow runs down from the ocelli; the face and clypeus densely covered with pale golden pubescence; the base of the clypeus yellow, the middle rufous, the apex black. The scape of the antennæ yellow, rather thickly covered with long, white hair; the flagellum rufous, slightly darker in the middle above. Pro- and meso-notum with the scutellum thickly covered with short, dark fulvous pubescence, and strongly and uniformly punctured; the median segment thickly covered with long, pale fulvous hair; the base with a row of stout, straight, short keels. Mesopleuræ thickly covered with pale fulvous pubescence; the metapleuræ at the base and apex fringed with long, pale fulvous hair. Wings hyaline; the apex distinctly smoky; the costa, stigma, and nervures fulvous; the second cubital cellule at the top equal in length to the top of the third; the first recurrent nervure is received near the apical fourth; the second in the apical third of the cellule. Legs yellow; the coxæ and trochanters black; the four anterior femora for the greater part above; and the basal two-thirds of the hinder femora ferruginous; the hinder femora large, broadly rounded above; the base, before the tooth, straight; the tooth oblique, directed towards the apex; the outer side of the apex of the hinder tibiæ curved; the inner projecting, in width not much less than half of the outer; its apex oblique, the inner side rounded; near the base of the hinder tibiæ on the posterior side is a large, black, oval mark, brownish on the outer edge. Abdomen shining, black; the apex of the basal segment covered

thickly with depressed, fulvous pubescence ; the apices of the first and fourth segments broadly fulvous-yellow ; the apical segments entirely of that colour ; the apical segment thickly covered with long, golden hair ; the ventral segments black.

NOMIA MAHRATTA, *sp. nov.*

Long. 8 mm. ♀.

Hab. Bombay (*Wroughton*).

In Bingham's table (*l.c.*, p. 449), this species comes into "♂. Thorax above with thin cinereous pubescence" which is now divided into :—

1. Area at base of median segment finely reticulate ; the legs rufo-testaceous ; the pubescence on the ventral segments cinereous. *N. aurata*.

2. Area at base of median segment finely longitudinally striated ; only the hinder tibiæ and tarsi rufo-testaceous ; the pubescence on the ventral segments dense, ferruginous.

N. mahratta.

Head, from a little above the antennæ, thickly covered with white pubescence ; the apex of the clypeus fringed with long, golden hair. The mandibles, before the middle, piceous ; the front and vertex impunctate. Antennæ rather slender, black, the scape almost bare ; the apical joint rufous. Thorax thickly covered with longish hair ; fuscous in colour above, almost white on the sides ; the mesonotum opaque, finely rugose, almost transversely striated ; the scutellum shining, bearing shallow, scattered punctures, and sparsely covered with long, fuscous hair ; the post-scutellum thickly covered with white pubescence. Median segment with an abrupt, oblique slope ; opaque, finely and closely shagreened ; the base with the area not clearly limited, and closely longitudinally striolated ; the furrow on the apical half wide and deep at the base. Propleuræ shining, coarsely aciculated ; the mesopleuræ at the tubercles thickly covered with white pubescence ;

the metapleuræ covered with long, white hair. Legs black; the hinder tibiæ and tarsi rufous; the coxæ and femora covered with long, white hair; the tibiæ and tarsi more thickly covered with shorter hair; the hair on the hinder tibiæ being longer and thicker; the claws rufous. Wings hyaline, the apex slightly infuscated; the second cellule scarcely half the length of the top of the third; the costa and stigma black; the nervures fuscous; the second recurrent nervure is received the length of the second cubital cellule from the apex of the third cellule. Abdomen shining, impunctate; the base and sides of the basal segment covered with long, white hair; the sides and apices of the other segments fringed with white pubescence; the ventral segments thickly covered with dark rufous hair.

The antennæ in this species are more slender and the ventral surface of the abdomen more thickly pilose than usual, *e.g.*, than in *N. ellioti*.

NOMIA CHRYSOPA, *sp. nov.* (Pl. 4, f. 13.)

Long. 6 mm. ♂.

Hab. Allahabad (*Rothney*).

In the Key (*l.c.*, p. 449) it forms a new group of the species with the abdominal fasciæ white; "♂. Enclosed space at base of median segment, with stout, oblique keels," not punctured as in *N. oxybeloides*, nor obscurely transversely striated as in *N. rustica*.

Head black; from shortly above the base of the antennæ, thickly covered with golden pubescence, behind the eyes with longish, white pubescence; the vertex with longish, fuscous hair, longer and paler behind. Front and vertex closely and strongly punctured, except a small, smooth spot outside the hinder ocelli. Mandibles black; bearing at the base long, pale fulvous hair. The scape

yellow; the flagellum yellowish-ochraceous beneath; blackish above; the flagellum bare; the scape with long, pale hair. The edge of the pronotum on the top covered with a distinct line of dirty-yellow, depressed pubescence, in front of which is a narrow belt of long, pale hairs. Mesonotum closely and somewhat strongly punctured, opaque; sparsely covered with short, fuscous pubescence; the post-scutellum covered with longer, stiff, pale hair on the top. The "enclosed space" on the base of the median segment shining; distinctly margined behind: and having stout, slightly oblique, widely separated keels; the median segment with an oblique slope; rugose, obscurely reticulated at the top, and indistinctly keeled down the middle. Mesopleuræ thickly covered with long, pale fulvous hair. Legs bright lemon-yellow; the coxæ and trochanters black; the base of the femora broadly black, tinged with brown; a brownish mark on the outer and inner side of the hinder tibiæ; the hinder femora have, shortly beyond the middle, a large, oblique, triangular tooth; the hinder tibiæ gradually dilated to the apex, which ends on the inner side in a large, triangular tooth. Wings hyaline, slightly infuscated, especially towards the apex. Abdomen black, the apex of the basal three segments with a belt of white, depressed pubescence; the apical three covered entirely with similar pubescence; the first and second segments coarsely punctured; the third and fourth finely and closely punctured; the last rufous round the apex; the apices of the basal three segments covered with long, white hair, as is also the apical segment.

The form of the hind legs is not unlike those of *N. combusta*, with which it otherwise is closely related; but the shape of the femora serves to separate them; in *N. combusta* they are roundly curved before the tooth; in *N. chrysopa* they are perfectly straight, not curved in any way.

NOMIA MACULITARSIS, *sp. nov.* (Pl. 4, f. 12.)

Long. 8 mm. ♂.

Hab. Poona (*Wroughton*).

Agrees with *N. floralis* Sm. and *N. pilipes* Sm. in having the base of the abdomen red ; only the females of these two species are known, but it can hardly be the ♂ of either of them. It comes nearest in those characters common to both sexes to *N. floralis*, from which it may be separated as follows :

Median segment with a median vertical keel, the area at base densely punctured ; the legs rufo-piceous.

N. floralis Sm.

Median segment without a median vertical keel, the basal area distinctly striolated ; the legs black, the tarsi rufous.

N. maculitarsis.

N. pilipes Sm. has the basal two and the basal two-thirds of the third abdominal segments pale-red, and the basal area of the median segment is "very coarsely punctured."

The head in front from shortly below the ocelli densely covered with fulvous hair ; the front and vertex shining, impunctate. Mandibles black, striated ; the striae curved at the top. The propleuræ shining, impunctate, the apex only covered with long, white hair ; the meso- and meta-pleuræ thickly covered with long, white hair. Wings hyaline, the costa, stigma, and nervures pale fuscous ; the second cubital cellule at the top not half the length of the third at the top ; the first recurrent nervure is received shortly beyond the middle of the cellule. Abdomen shining, the base and the sides covered with white hair ; the basal segment entirely red, closely and finely punctured ; the base and sides of the second rufous, the rest of it piceous ; the apices of the second and following segments smooth, silvery white ; the ventral surface entirely red. Legs black, the tarsi pale rufous, the hinder

infuscated towards the apex ; the hinder femora triangularly dilated above, below straight, except for a slight, blunt, somewhat triangular projection near the base ; the apex of the hinder tibiæ ends in a stout triangle, which behind is prolonged into a stout, roundly curved process, rounded at the end and piceous at the base of the apical tooth ; sparsely covered with long, pale fulvous hair ; the outer orbits bearing long, white hairs, which are longer and more numerous on the lower part. The scape and second joint of the antennæ entirely black ; the flagellum fulvo-brownish, blackish above ; the scape with a few fuscous hairs ; the flagellum bare. The pro- and part of meso-notum densely covered with long, fulvous hair ; the rest of the mesonotum with shorter hair ; in the middle of the mesonotum are two narrow furrows ; near the sides, opposite the tegulæ, is a slightly wider and deeper furrow ; the scutellum is sparsely covered with very long, pale hair ; the post-scutellum covered with white, woolly pubescence, and bearing also some long, white hairs ; the mesonotum is closely, but not very strongly, punctured ; the scutellum impunctate. The median segment is rounded at the base, semiperpendicular at the apex ; punctured, but not strongly ; the sides and apex covered with long, soft, white hair ; the basal area strongly obliquely distinctly margined on either side, the hinder trochanters are rufous ; the femora are sparsely covered with long, the tibiæ and tarsi thickly with short, white pubescence.

NOMIA (?) ALIENA, *sp. nov.* (Pl. 4, f. 14.)

Long. 7 mm. ♀.

Hab. Poona (*Wroughton*).

The undernoted species comes into Bingham's Section B. of *Nomia*, having the abdominal segments fringed with hair ; but it differs from all the species in the prothorax having in front of the tegulæ a curved, thin, horn-like,

semitransparent projection, extending equally on both sides of the tegulæ. Behind the eyes there is a sharp keel extending their entire length, and separated from them by a clear space.

Head as wide as the mesothorax ; the front and vertex coarsely punctured, sparsely covered with short, fuscous hair ; the centre below the antennæ shining, its middle almost impunctate ; the base and apex with large, deep, widely separated punctures ; the part next the eyes closely rugosely punctured, almost longitudinally striated. Clypeus with large, deep punctures, except near the eyes, where the punctures are smaller and closer. Labrum fringed with long, fulvous hair. Mandibles black, piceous at the apex ; the base opaque, finely striated ; with one large apical, and a smaller subapical tooth. Scape of antennæ fringed with longish pale hair above ; the flagellum brownish beneath towards the apex. Pro- and meso-notum and scutellum shining, smooth ; the meso-notum with three shallow furrows in front ; the apex of the scutellum with a row of shallow, large, round punctures ; the post-scutellum covered with white pubescence. Median segment with an oblique slope at the apex ; without any basal area, but with a faint indication of two converging furrows. The mesopleuræ coarsely punctured at the base ; the apex with a broad clearly defined space, broad at the top, gradually narrowed to the bottom, and bearing stout, longitudinal, distinctly separated keels. Metapleuræ shining, uniformly marked with shallow punctures and with a broad, shallow furrow at the base. Wings hyaline, the costa, stigma and nervures testaceous ; the second cubital cellule is of nearly equal width, and scarcely one-half the length of the top of the third cellule ; the first recurrent nervure is interstitial ; the second received at the end of the second cellule, the transverse cubital nervure turning up sharply obliquely from it,


and not continued in a straight, or but slightly oblique, line from it as usual. In the hind wings, the nervures are not continued to the end of the wings. Legs densely covered with long, pale or pale fulvous hair; the hinder tarsi have the basal joint dilated above and compressed; the second joint is obliquely dilated above, both more so than usual.

NOMIA (?) INTERSTITIALIS, *sp. nov.*

Nigra, flagello antennarum rufo; alis hyalinis, nervis stigmatæque nigris. ♂.

Long. 7.5 mm.

Hab. Allahabad (*Rothney*).

Scape of antennæ black; sparsely covered with long, white hair; the flagellum almost bare, infuscated above towards the apex. Face and clypeus sparsely covered with long, white hair. Clypeus finely punctured, finely longitudinally striated; the anterior ocelli with a curved furrow in front; behind them is a narrow -shaped one. Mandibles at the base covered sparsely with long, white hairs. Thorax above with short, fuscous pubescence; sparsely and shortly pilose; the hair on the scutellum longer; the basal area on the median segment large, closely and finely longitudinally striated, and bordered by a rather deep furrow, which is continued down the middle of the segment. Pleuræ densely covered with short pubescence. Wings short, reaching only to the fourth abdominal segment; the second cubital cellule small, shorter than broad; above one-half the length of the third; the first recurrent nervure is almost interstitial; but received nearer the base than the apex of the nervure; the second is received the length of the second cellule from the apex of the third. Legs black; the calcaria white; the coxæ thickly, the femora sparsely, covered with long, white hair; the tibiæ and tarsi very thickly with shorter, white hair;

the hair on the under side of the metatarsus rufous; the apex of the tarsi rufous. The femora and tibiæ are normal, not dilated, except that the hinder tibiæ on the inner side are triangularly produced, but not sharply, the apex being rounded. Abdomen shining, impunctate; the base of the segments belted with white, depressed pile; the second to fourth segment with wide transverse furrows near the base; the ventral segments smooth, shining; their apices fringed with short, white hair; the sides of the third and fourth with long, white hair; the penultimate segment broadly depressed in the middle, with a smaller, somewhat pear-shaped, depression on either side at the apex.

This is perhaps not a true *Nomia*. The trophi do not differ in form from those of that genus. The only point in which the legs agree with those of *Nomia* is in the projecting apex of the hinder tibiæ. It differs in the interstitial first recurrent nervure and in the shorter wings.

MEGACHILE NIGRICANS, *sp. nov.*

Nigra, capite thoraceque pallide hirtis; alis hyalinis. ♂.

Long. 11 mm.

Hab. Trincomali, Ceylon (*Yerbury*).

In Bingham's Key (*l.c.*, p. 471) it comes in "A. Abdomen black, with entirely black pubescence above," and "C. wings hyaline," which only contains the ♂ of *M. anthracina*, a very different species from *M. nigricans*, being much larger, the pubescence on the face bright fulvous, the fore legs more or less rufo-testaceous, the wings infuscated at the apex, the fore legs spined, &c.

Entirely black, the wings hyaline, the costa and nervures fuscous, darker at the base. Head below the ocelli thickly covered with long, pale, behind the ocelli more sparsely with longish, black, hair; front and vertex strongly punctured, except a smooth, shining space on the outer side of the hinder ocelli; the clypeus strongly

punctured; the labrum fringed with long, pale hair. Mandibles black, shining, the base covered with long, fuscous, intermixed with shorter, silvery hair; their apices shining, armed with one large, somewhat triangular, tooth at the apex; the base strongly punctured. Antennæ short, black, the apical half dull rufous on the under side; the scape with a few short hairs; the flagellum bare, shining. Pro- and meso-notum thickly covered with longish hair; longer and paler on the pronotum; closely rugose; the scutellum, if anything, more strongly rugose and with the hair longer; the median segment with a perpendicular slope, thickly covered with long, pale hair. Pleuræ thickly covered with long, black hair; the lower part of the mesopleuræ excavated, shining; the lower part of the metapleuræ smooth. Abdomen shining, pilose, the segments fringed with white hair; the ventral surface thickly covered with longish, stiff, blackish hair. Femora sparsely; the tibiæ and tarsi very thickly covered with long, black hair; the fore coxæ simple, not spined.

TETRALONIA.

Under this generic name Bingham describes two species—*T. duvancelii* Lep. = *elegans* Sm., and *T. himalayensis* Bing. In these two species the maxillary palpi are said to be 6-jointed. Whether this is an original observation, or merely copied from Smith (*Cat. Hym.*, ii., p. 297), who also gives six joints to the maxillary palpi of *Tetralonia*, I am unable to say. Apart from the difference in the number of palpal joints, my species agrees in the other generic characters with *Tetralonia* as given by Bingham. In both the species here described the maxillary palpi have only four joints, as have also the labial. Latreille, who first described *Tetralonia*, gives five as the number of joints in the maxillary palpi, this being likewise the number in Smith's genus *Xenoglossa*. Mr. W. H. Patton

(Generic Arrangement of the Bees allied to *Melissodes* and *Anthophora*. *Bull. U.S. Geol. Surv. Territ.*, v., p. 471) gives also five joints for *Tetralonia*, but it is not clear to me if he has himself examined the genus or gives a quotation from Latreille. *Melissodes* Latr. is described in full by Patton (*l.c.*, p. 472); it has, like our species, 4-jointed maxillary palpi, "the fourth joint often minute," which does not conform to our Indian species any more than does his description of the first joint of the labial palpi being twice the length of the second. In other respects our species do not quite fit into Patton's diagnosis. Further, they do not agree with each other in the form of the palpi. For those species with 6-jointed maxillary palpi, Patton established (*l.c.*, p. 473) the genus *Synhalonia*, representing *Macrocera* Lep., *Tetralonia* Sm., and *Melissodes* Cresson, *nec* Latr.; but it can hardly be regarded as generically identical with our species. Taschenberg (*Berl. Entom. Zeits.*, xxvii., p. 78) groups the genera under *Macrocera* (an inadmissible name, being preoccupied in *Diptera*); *Melissodes* Latr. with 4-jointed maxillary palpi; *Macrocera* *sen. str.* with them 5-jointed; *Xenoglossa* Sm. with them also 5-jointed; *Synhalonia* with them 6-jointed and *Ancylloscelis*, of which the palpal characters are not given, but which is treated by Smith (*Cat. Hym.*, ii., p. 365) as a doubtful synonym of *Tetrapedia* Klug, a very different genus from *Tetralonia*. As Mr. Rothney's ♀ differs in many respects from Mr. Wroughton's male and from the described genera, I give a generic description of it here, leaving it for further investigation to decide whether the points of difference in the palpal and other characters are of generic, sub-generic, or of mere specific importance.

♀. Antennæ shorter than the thorax; ocelli ∴. Mandibles without teeth. Tongue not elongate, if anything shorter than the palpi; the apex ending in a button; paraglossæ a little longer than the tongue; densely pilose;

the two basal palpal joints greatly enlarged and thickened; the basal slightly longer than the second; the apical two joints of nearly equal length. The stipes longer and broader than the galea by about one-fourth; the top on the inner side rounded inwardly and fringed with long, stout, stiff hairs; the first and third joints of the palpi are nearly equal in length; the fourth is slightly shorter; the second is the longest. Wings very short, not reaching to the apex of the second abdominal segment; the two recurrent nervures received quite close to the transverse cubital nervures. Fore wings with three cubital cellules; the third at the top scarcely so long as the second; at the bottom nearly twice its length. Legs densely pilose; the hinder tibiæ and tarsi densely covered with long hair; the calcaria simple, of nearly equal length; the claws with a stout tooth near the base. Abdomen not densely pilose; the apical segment with a large, smooth, glabrous area in the middle, somewhat triangular in shape, but with the apex rounded.

TETRALONIA BREVIPENNIS, *sp. nov.* (Pl. 4, f. 6, 6a, b.)

Nigra, flagello antennarum rufo; pedibus longe pallide pilosis; alis brevibus, costis, stigmatate nervisque testaceis. ♀.

Long. 9; exp. at 6 mm.

Hab. Allahabad (*Rothney*).

Antennæ black; the flagellum from its second joint rufous beneath; bare; the scape with a few short, black hairs. Head strongly punctured; the clypeus more strongly than the front; the sides of the vertex much more finely; the occiput fringed with long, erect, white hair above; the front and vertex with short, the sides of the clypeus with much longer, white hair. The apex of the clypeus distinctly margined, ferruginous. Mandibles rufous in the middle and fringed with long, fulvous hair on the lower side. Mesonotum and scutellum closely punc-

tured; the median segment at the apex with a steep, oblique slope; the base strongly and closely punctured; the apex with the sides less strongly punctured; the middle impunctate; the apex at the sides thickly covered with long, white hair. Legs thickly covered with long, pale fulvous hair; the floccus very long and thick; the metatarsus greatly enlarged, very thickly haired; the hair mixed with stiff spines. Wings reaching not much beyond the middle of the second abdominal segment; the second cubital cellule at top not much longer than the third at the top; the first recurrent nervure is received near the transverse cubital; the second is interstitial. The first transverse basal is received before the basal, not joined to it. The basal segment of the abdomen is covered with long, white hair, almost bare in the middle at the apex, perhaps through being rubbed; the second, third and fourth covered with white, depressed pubescence; the fifth thickly with fulvous pubescence; the middle area on the last segment smooth, glabrous; the sides of the segment thickly covered with fulvous pubescence. The bases of the ventral segments covered with white pubescence; the apices of the three basal segments brownish; the hypopygium bare, sharply separated from the sides by a deep depression.

TETRALONIA PUNCTATA, *sp. nov.*

Long. 8-9 mm.

Hab. Poona (*Wroughton*).

In Bingham's key (*l.c.*, p. 520) *T. punctata* will come in as follows:—

Clypeus yellow.

Clypeus "very lightly punctured." *T. duvancelii* Lep.

Clypeus very strongly punctured all over. *T. punctata*.

Antennæ rufo-testaceous; bare, the basal joint black. Head black; thickly covered with long, whitish hair,

except behind the ocelli ; the clypeus and labrum lemon-yellow ; the clypeus strongly and uniformly covered with large, shallow punctures, its apex almost transverse ; the labrum punctured like the clypeus, but not quite so strongly, thickly fringed with long, white hair. Mandibles for the greater part ferruginous, black at the base, with a yellow mark in the centre. Thorax thickly covered all over with long, pale fulvous hair ; the tegulæ yellow. Wings hyaline, the costa and stigma rufo-testaceous ; the second and third cubital cellules almost equal in length at the top ; the second at the bottom hardly one-half the length of the third. Legs thickly covered with pale hair ; on the under side of the tarsi with rufous hair ; the apical joints of the tarsi being rufous ; the calcaria pale. Abdomen black ; the basal segment thickly covered with long, pale hair ; the second and third segments with a broad belt of depressed fulvous down on their base ; the fourth and fifth covered entirely with pale, fulvous pile, the apical segments with the pubescence rufous, not pale fulvous ; the ventral segments fringed with pale fulvous hair ; the texture of the pygidium is hidden by the pubescence ; the hypopygium is smooth, bare, the base black, the rest ferruginous.

The ligula is elongated, extending considerably beyond the palpi, is stout and densely haired ; the paraglossæ are also hairy and are slightly longer than the palpi ; the basal joint of the palpi is about one-half longer than the second ; the apical two minute, the last shorter than the preceding. The second joint of the maxillary palpi is the longer, the rest subequal.

ANTHOPHORA CELLULARIS, *sp. nov.*

Long. 7-8 mm. ♂.

Hab. Poona (*Wroughton*).

In the table (*l.c.*, p. 525) this species comes in at

“*b*². Abdomen beneath black,” which will now be subdivided into:—

Clypeus bimaculate ; the second and third cubital cellules subequal. *A. confusa* Sm. and *A. fallax* Sm.

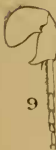
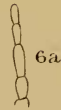
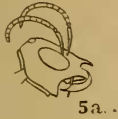
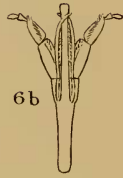
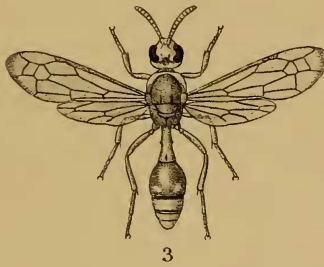
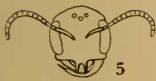
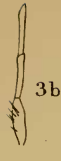
Clypeus immaculate ; second cubital cellule not one-half the length of the third. *A. cellularis*.

Head black, the vertex and front closely, but not strongly, punctured ; the cheeks impunctate ; the clypeus with some large, widely separated, punctures ; the clypeus, a somewhat triangular mark above it, the sides from a little above the base of the antennæ, dilated in the middle to meet the upper mark, the labrum and the base of the mandibles, yellow ; the mandibles piceous, intermixed with black. The front and vertex and the outer orbits thickly covered with long, griseous hair ; the clypeus bearing a sparse pubescence ; the labrum fringed with long, white hair. The scape of the antennæ yellow beneath ; the flagellum brownish. The pro- and meso-notum thickly covered with short, dark griseous hair ; the scutella with much longer white, the sides of the median segment and the pleuræ with long, white hair ; the median segment closely punctured ; the pleuræ are much more strongly punctured ; the lower part of the metapleuræ obscurely longitudinally striated. The outer sides of the tibiæ and tarsi thickly covered with long, white hair ; the metatarsus thickly covered on the inner side with long, bright rufous hair ; the claws rufous. Wings hyaline ; the stigma and nervures blackish ; the second cubital cellule at top and bottom hardly one-half the length of the third ; at the top it is half the length it is at the bottom ; the first recurrent nervure is received near the middle of the cellule ; the second distinctly in front of the third transverse cubital nervure, and not interstitial as it is with *A. fallax*, &c. Abdomen shining,

closely but not strongly punctured; the first to fifth segments banded with white pubescence, the last closely and strongly punctured above, the apex rufous; the hypopygium dark rufous, the middle carinate; the sides fringed with long, white hairs, the third to fifth ventral segments fringed with long, white hairs; the basal segments piceous.

EXPLANATION OF PLATE.

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- Fig. 1. *Mutilla indecora*, ♀.
 „ 2. *Passaloecus reticulatus*, ♀.
 „ 3. *Pterochilus fulvipennis*, ♂. 3a, labial; 3b, maxillary palpus.
 „ 4. *Sudila ceylonica*, ♀.
 „ 5. „ *bidentata*, ♂. head from the front; 5a from the side.
 „ 6. *Tetralonia brevipennis*, ♀. 6a, maxillary; 6b, labium and palpi.
 „ 7. Hind leg of ♂ *Nomia aureohirta*.
 „ 8. „ ♂ „ *varipes*.
 „ 9. „ ♂ „ *fulvohirta*.
 „ 10. „ ♂ „ *erythrogaster*.
 „ 11. „ ♀ „ *latispina*, and 11a ♂.
 „ 12. „ ♂ „ *maculitarsis*.
 „ 13. „ ♂ „ *chrysopa*.
 „ 14. *Nomia aliena*, ♀.
 „ 15. „ *purpureo-lineata*, ♀.
 „ 16. *Steganomus gracilis*. ♂.



W Purkiss, del. et lith